THE IRON AGE

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Reading Matter Contents.....page 1606
Alphabetical Index to Advertisers " 199
Classified List of Advertisers " 190
Advertising and Subscription Rates" 1623

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THE IRON AGE

New York, Thursday, May 23, 1907.

Ore Vessels Fighting Ice.

Our readers have been apprised from week to week of the difficulties which this year have been encountered in opening navigation on the Great Lakes. The spring has been unusually cold, and wintry conditions have prevailed very much later than for many years. One of the leading shippers of iron ore at Cleveland, Ohio, writing under date of May 14, says: "All the different interests entering into the supply of ore for 1907 are going to be taxed to their utmost to handle the business. The very sluggish opening of the season is having its effect. The ore moved in April was exceedingly small in amount, and at this writing I do not think that over 25 per cent. of

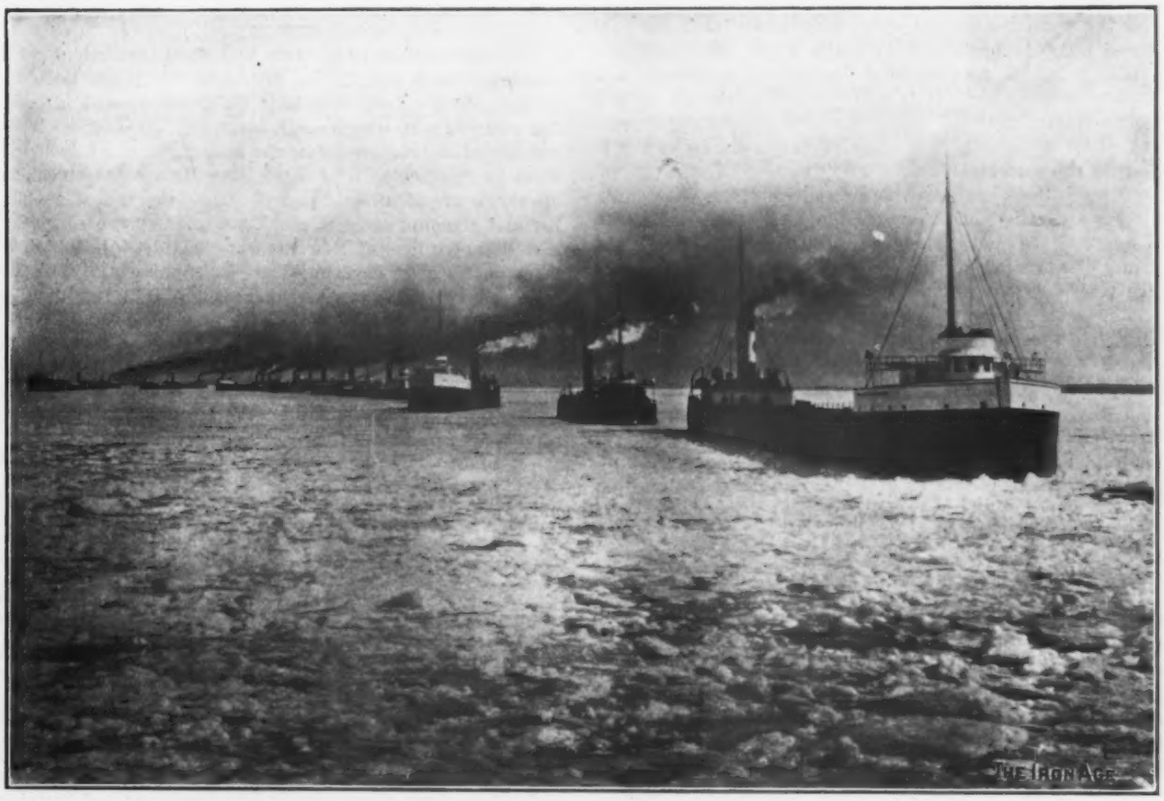


Fig. 1.—Upbound Ore Fleet Working through the Ice Off Point Iroquois, Lake Superior, April 26, 1907.

Fig. 2.—Trouble with Ice at the Gates of the Sault Ste. Marie Canal, May 7, 1907.

the ore carrying fleet has delivered a cargo of ore. Ice conditions prevented an early start, which resulted in a greater loading up of coal cargoes at Lake Erie, until there was the largest coal fleet that ever started up the lakes and it naturally followed that all the coal unloading docks and railroads above were jammed. We have been in the habit in ordinary seasons of loading coal cargoes a few days apart, while this year we loaded up a number of our smaller sized boats and had 20,000 tons of coal to go forward at once over a small railroad proposition. Ore is still moving a little sluggishly at upper lake ports and loading still continues somewhat slow, but the warmer weather which has shown itself the past three days is beginning to make some impression. I would think the movement of ore up to June 1 will be a little disappointing. It is quite probable, indeed, it will be necessary, that the movement in June, July and August shall be greatly in excess of last year in order to handle the material."

Illustrations are herewith presented which show quite impressively the conditions encountered by ore vessels in attempting to make their start for the season in the transportation of ore on the lakes. These illustrations are reproductions of photographs furnished through the kindness of James Gayley, first vice-president of the United States Steel Corporation. Fig. 1 shows an upbound fleet working through the ice on Lake Superior off Point Iroquois, on April 26. This location is on Whitefish Bay, at the east end of Lake Superior, a short distance from the northern terminus of the Sault Ste. Marie Canal. Fig. 2 shows the conditions which prevailed in the canal itself as late as May 7. The manner in which ice interfered with operations at the gates of the lock is here strikingly shown.

Electric Haulage on a Shipway.—To draw a vessel weighing 900 tons out of the water in 30 min., an electric haulage has recently been applied to a slipway in Dublin. From 1838 to 1860 the haulage was by hand, and now for nearly 50 years by steam, without much advantage over the hand operation, so far as time consumed was concerned. In the new equipment a flexible steel wire hawser is coiled on grooved drums large enough to carry the entire length of the hawser without a second coil. Spur wheels, bolted to the drums, work by pinions which can be put in or out of gear by means of clutches, and thus enable a small drum, installed for hauling the empty carriage back to the water, to be operated independently of the large one. Both drums operate at the same speed of winding. A 100-hp. 500-volt motor running at 750 rev. per min. is used. The gradient of the slip is 1 in 16, and the weight of the carriage on which the ships are hauled out of the water is about 100 tons. The greatest number of vessels handled are of below 500 tons.

Function of the Soft Metal Cap for Projectiles.—The somewhat mysterious action of the soft metal cap for armor piercing shells is perhaps most commonly explained as due to its melting at the instant of impact and acting as a lubricant for the nose of the shell during its passage through the armor. This idea is untenable, however, since it would hold true in the case of the penetration of soft armor only, and not in the case of hardened steel, where the metal is cracked and shattered. In reality, the device is more effective when piercing hardened materials than softer ones. A German engineer ascribes the effect to the fact that the point of the projectile is saved from deformation at the instant of impact. The mass of soft metal in which it is embedded acts as a cushion, and distributes the pressure over a fairly large cross section, instead of allowing it to concentrate on the point, which it would otherwise fracture. The point is thus preserved, to act as an effective chisel in piercing the hardened outer layer.

A correspondent of the *Engineering and Mining Journal* writes of experiments on the Northern Pacific Railway in the use of heavy galvanized sheets for the decks of wooden bridges to guard against fire. A large percentage of the destruction of railroad bridges by fire comes from live coal cinders from the ash pans of the locomotives. In the practice of the Northern Pacific Railway in the past year, galvanized sheets are put on in 8-ft. lengths and riveted with copper rivets. The rails are laid on top of the sheets and spiked through. Bolts for the timbers also go through the sheets. On the ends of the bridge the sheets are flashed under the first tie of the roadbed and no part of the wooden frame is exposed.

Sir Hugh Bell's Presidential Address.

At the meetings of the Iron and Steel Institute, held in London, May 9 and 10, the president, Sir Hugh Bell, son of the late Sir Lowthian Bell, delivered a most interesting address. It was largely historical, dealing with the wonderful developments in the manufacture of iron and steel in the period of a little over 100 years since the speaker's grandfather, Thomas Bell, "the son of a Cumberland yeoman, came to the Tyne to enter the service of a well-known firm of Newcastle merchants, into which he was shortly afterward admitted as a partner." This occurrence identified the fortunes of the Bell family with the manufacture of iron. The developments in Great Britain form only a part of the address, the achievements of other countries receiving their due share. He gives the output of pig iron in the world in 1905, the latest date for which complete statistics are available, as follows:

Country.	Tons.	Percentage of total.
United States	23,360,258	42.7
Germany and Luxemburg	10,875,061	20.0
United Kingdom	9,608,086	17.6
France	3,076,550	5.5
Russia	2,715,063	5.0
Austria-Hungary	1,540,896	2.8
Belgium	1,310,290	2.4
Sweden	539,437	1.0
Canada	403,449	0.8
Spain	383,100	0.7
Italy	143,079	0.3
Other countries	655,000	1.2
Totals	54,610,269	100.0

After portraying in felicitous language the marvels which have been accomplished in overcoming and training the forces of nature, President Bell indulges in the following flight of fancy:

> And if I to-day look forward, as I picture that other man to have done a century since, what form might my guess of the future take? How in a hundred years will the great swiftly gliding ship of those days be propelled? With little, or mayhap with no machinery on board, with barely any crew she speeds on her way, drawn by the electric force generated at Niagara, and transmitted over the Atlantic by wireless telegraphy. She crosses to New York, takes her cargo, and returns as she came. Strange as my forecast may seem, it is no more incredible than what has happened since 1807. The things which to us are commonplaces would have been deemed impossibilities by our forefathers. The world moves on in a succession of dreams and their fulfillment. The wild imaginings of one age become the splendid realities of the next, for
>
> ". . . all experience is an arch wherethro'
> Gleams that untravel'd world whose margin fades
> Forever and forever when I move."

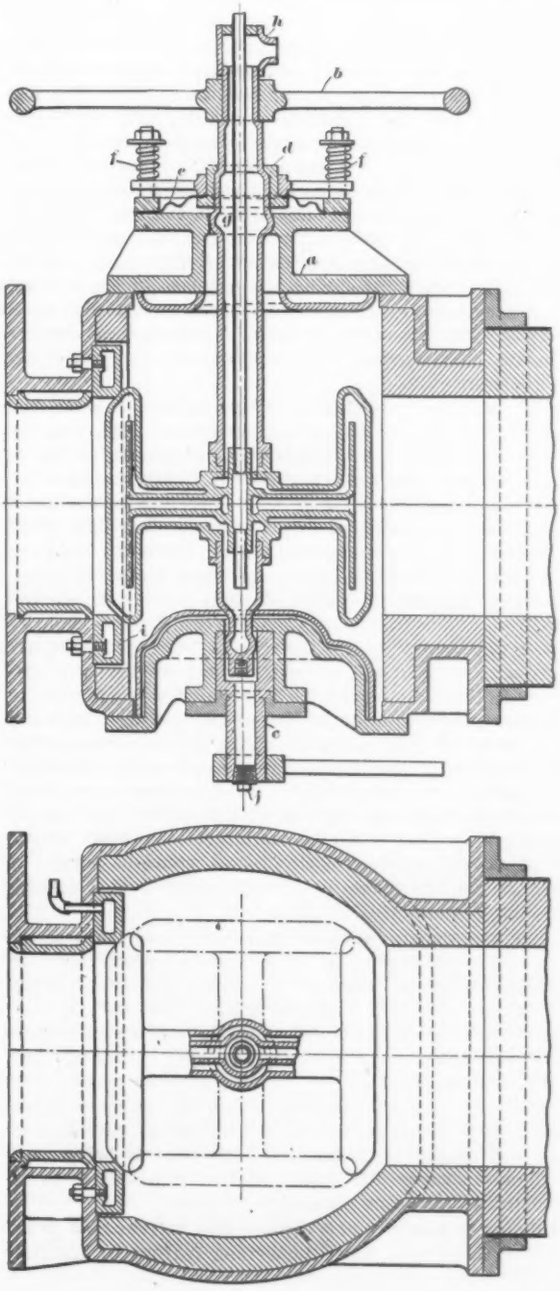
A chronological table of some of the more important events connected with iron and steel during the past 100 years forms an admirable supplement to the address.

The dynamo dynamometers for testing automobile engines, which have been supplied by Joseph Tracy to a number of the leading automobile builders, will in future be marketed by the Sprague Electric Company, New York, under an arrangement by which Mr. Tracy will supervise the construction of the apparatus, which will be manufactured at the Sprague Electric Company's works. The increasing use of this accurate means of determining the horsepower of gasoline engines is in line with the growing movement toward standardization and correct power ratings. The method has been used for a number of years abroad by the Panhard concern and other not able builders, and is now being taken up quite extensively by American manufacturers.

The Cronemeyer Gas Valve.

A new hot blast or gas valve, embodying several new features, is shown by the accompanying drawing in plan and elevation, which clearly illustrate its construction. The inventor and patentee of this valve is Henry C. Cronemeyer, a mechanical engineer in the Monongahela Blast Furnace Department of the National Tube Company at McKeesport, Pa.

Two valve disks are mounted on a revolving stem, to



The New Hot Blast or Gas Valve Invented by Henry C. Cronemeyer, McKeesport, Pa.

secure perfect balance under all pressures, and to permit the use of either in case of damage to the other. On one end of the valve stem, which extends through the head *a* is mounted the hand wheel *b*, by which the stem is turned through any desired angle. The other end rests on the eccentrically bored bushing *c*, which when turned by the lever attached to it, slightly retracts the valve disk from its seat, after which it can be freely turned by means of the hand wheel above mentioned. For closing the valve the operation is reversed. No stuffing boxes are used, their place being taken by the bushing *c* and cap *d*, respectively, whose conical surfaces are pressed against corresponding seats by the internal pressure in the case of the former, and by the spring *f* in the case of the latter.

The weight of the valve stem and disk is taken by the bead *g* on the valve stem, resting in the bore of head *a*, while the escape of gas is prevented by the cap *d*, secured to the head by the corrugated diaphragm *e*. This, by its deflection, allows for the moving of the valve from its seat, the actual movement at this point being very small, since the head *g*, acting as a fulcrum, is very close to the diaphragm. The valve disk can thus be always made to seat tightly even with unequal wear. The springs *f* counteract the internal pressure against the diaphragm, relieving it of all strain. The valve stem and disk are effectively cooled by a circulation of water, which enters through the central pipe and is discharged through the tee *h*, after flowing through the disks. The removable seat *i* is likewise cooled.

To remove the valve disk or seat, the plug *j*, in the end of bushing *c*, is removed, and a bar is screwed into the end of the valve stem, when, by loosening the bolts on the head *a*, the whole can be quickly and easily slid out of the casing for inspection or repair.

The advantages claimed for this valve are flexibility of application, means for throttling, ease of manipulation and repair, ready removability of worn parts and adaptability to any position of pipe.

Electrical Equipment of the St. Louis.

The new armored cruiser St. Louis, of the United States Navy, is equipped with five 125-volt generating sets, two of 100-kw., and three of 50-kw. capacity. The engines are of the vertical cross-compound type; the larger ones have 10 and 18 in. x 10 in. cylinders, while the smaller engines have 8 and 14 x 8 in. cylinders. The dynamos are of the direct-current, compound-wound, multipolar type. In addition to a large number of other motors, there are 27 used for electrically-driven ammunition hoists. These are reversible, and operate at 1000 rev. per min. Frictional slip gears are fitted between the motors and hoists, to forestall any damage from a sudden stopping of the hoists; and stops are provided, to prevent ammunition from falling down the hoists.

The closed fireroom system of forced draft is used, the blowers being located on the protective deck under the uptakes. There are two for each fireroom, with fans 69 in. in diameter and 25 in. wide at the periphery. Each fan is driven by a double upright inclosed engine, with two 7 x 5 in. cylinders. On the official trial trip, under forced draft, the boilers consumed 32.4 lb. of coal per sq. ft. of grate surface. The total horsepower required for the eight blower engines was 122.4, or less than one-half of 1 per cent. of the total (26,947) developed by the two main propelling engines. The temperature in the firerooms was kept down to an average of 88 deg. during the trial trip, which lasted 4 hr.

Some of the high power motor boats used in the Monte Carlo races had a universal joint in the shaft, between the motor and the thrust bearing, so that any flexure of the shaft from vibration, or the straining of the boat, would only slightly affect the running of the motor. This feature is believed to be valuable, even on small boats. Another feature of interest was the seemingly exaggerated precautions taken against the forming of eddies, such as tapering the end of the shaft to a point beyond the propeller and ending the stem with a sharp edge. In a series of experiments made some time ago by a Scotch designer, it was shown that the influence of the fineness of the stem is of very material moment in high speed vessels, and that in ships of slower speeds it is worth considering. The lessons taught by these experiments appear to have been taken to heart.

The Reading Iron Company, Reading, Pa., is testing on a commercial scale the Roe mechanical puddling process.

The Art of Galvanizing.—I.*

BY ALFRED SANG, PITTSBURGH.

The Agents of Corrosion.

One of the most persistent problems which confront the worker in iron and steel is the prevention of corrosion. We cannot rid ourselves of the agents which effect the corrosion of iron without at the same time ridding ourselves of the agents which are essential to life itself.

Air is indispensable both to human respiration and for the formation of rust and other oxides, for which it supplies the oxygen; moisture is necessary for the formation of clouds, which make the earth fertile, and it also supplies the medium in which rusting takes place and hydrates the oxide; carbonic dioxide is an animal by-product and a raw material for the vegetable world, and the exchange of carbonic dioxide and oxygen, which is continually taking place between the animal and the vegetable kingdoms, is of vital importance. Then, on the other hand, rust is not readily formed, if at all, unless there be an acid present, and the acid which is most universally distributed is carbonic acid, or hydrated carbonic dioxide.

There is, as you see, a close relationship between the processes of living and rusting, but while human beings make up for the rusting or decaying of their tissues by nutrition, it has not yet been discovered how to feed or regenerate iron, and until such a discovery is made we are compelled to take our cue from the ancient Egyptians and resort to embalming.

Methods for Protecting Iron and Steel.

There are two general ways of embalming iron to prevent its decomposition, which might be called, respectively, the nonmetallic and metallic methods. In the nonmetallic method the articles are coated with an organic substance, usually oil or varnish, the efficiency of which depends on its being more or less airtight; when coloring matter is added to the oil it becomes a paint, but I understand from authorities on the subject that a varnish free from pigments is preferable to anything else. The metallic method consists in coating the iron with some other metal, and it is this method which I have come to discuss with you.

The Composite Nature of Steel.

Iron rusts less readily than does steel; this is perhaps due to steel being a very composite material. In the iron, which forms the bulk of its composition, are dissolved or immersed a great variety of other substances; some of these are simple, such as graphite, silicon and manganese, and others are compound, such as carbides, sulfides, phosphides and silicides. The carbon compounds are very numerous and diversified, being due to different heat treatments; the best known are cementite, pearlite and martensite. Just as variety is to some people the spice of living, so is heterogeneous composition the spice of rusting, in the present instance at any rate. Nor is this by any means a solitary instance; it is a well-known fact that chemically pure zinc is dissolved very slowly by certain acids, whereas the commercial product, especially if it be high in iron, is rapidly dissolved.†

When steel is attacked by an acid pickle its surface becomes rough and pitted. This is due to the iron dissolving first and the impurities being left as a poorly adhering black powder. For some work which has to be coated, and especially if the coating is nonmetallic, it is desirable to remove the surface "rottenness" by means of the sand blast. The sand blast is often inconvenient or undesirable, but a high pressure water jet is also effective, and will remove at the same time the gelatinous or colloidal salts of iron which are left on the surface of the steel.

* Read before the American Foundrymen's Association, Philadelphia, May, 1907. Mr. Sang is vice-president of the Garland Nut & Rivet Company.

† The theory has been advanced by Weeren that this passiveness of pure zinc is due to the formation of a condensed layer of hydrogen on the surface, which prevents further action of the acid. It is difficult to see how the presence of iron would prevent this accumulation of hydrogen.

Metallic Coating.

If the metallic coating is considered merely as a garment which protects the iron article from atmospheric influences, the points which must receive special consideration are the closeness of the fit and the impenetrable qualities of the coating. A close fit is more readily obtained by depositing the metals electrically. In hot processes the uneven contraction of the coating and coated metals, the latter usually having the lower coefficient, will cause blisters, which are not always noticeable to the naked eye, but which are none the less present. This poor adherence, due to uneven contraction, is evidenced by the flaking, which will take place when the articles are bent.

With articles which do not undergo bending, such as castings, there may not be any flaking, but the air spaces are there just the same and oxidation will take place under the blisters, out of sight, slowly but surely, if the air is given access. Unfortunately the air has free access to these spaces, because no hot coated surface which has not received a mechanical treatment in the hot state, such as rolling, is free from faults and crevices; especially is this the case in rough and irregular work like castings, where the variety of strains taking place at the moment of setting of the coating metal produces an equivalent variety of microscopical fissures. Through these fissures the air, moisture and carbonic dioxide have free access to the iron.

An electrically deposited coating adheres a great deal better than does a hot coating, and this is the greatest point in its favor. Unfortunately, it is almost impossible to obtain a surface free from pores. Every photographer knows how specks of dust will cause pin holes in his negatives. A particle of dust is more or less light proof and protects the point of the film on which it rests from the chemical action of light. In electrolytic work each speck of impurity prevents the metal ions of the electrolyte from depositing on the spot covered by the impurity and a pin hole or pore is the result. These pin holes are like wells with a spot of rust, a speck of dirt or a particle of oil at the bottom, each of which was sufficient in itself to prevent the deposition of the coating metal, but none of which is able to prevent the access of the corroding agencies. Under the microscope rust will be found to originate in all cases in the pores, and I have examined specimens where the rust seemed to fairly ooze out of them. If articles could be made perfectly clean before being coated, the electrolytic process would be perfect as regards the two points of quality required of a coating considered as a covering only.

The Coating as a Mechanical Protection.

Considered merely as a mechanical protection, the coating should be resistant to impact and to abrasion, the latter being the most important. The soft metals, such as tin and zinc, do not stand up well against abrasion, but, unless their adherence be very defective, they will stand impact well, on account of their malleability at ordinary temperatures. It would be desirable to obtain a coating which would be as good a protection as zinc but tougher and harder. Aluminum is being used with more success, and if the metal were cheaper it would become an interesting competitor of zinc.

Different Behaviors of Tinplate and Galvanized Iron

But there is a more important feature of metallic coatings to be taken into consideration. This feature I shall introduce by the following example. If you make an incision in the surface of a sheet of tin plate and a similar one in a sheet of galvanized iron and expose the two sheets together to the same oxidizing agencies, you will soon note a very great difference in the behavior of the two mutilations. The cut in the galvanized iron will rust very slightly or not at all and the zinc at the edges will be oxidized, but the cut in the tin plate will not only show much more rapid and intense oxidation of the iron but the corrosion will extend beyond the edges of the cut, and in spite of the tin. A pin hole in a galvanized sheet will not rust; a pin hole in a tin plate will spread out like a star.

Metals in Contact.

I must now call your attention to a few scientific principles which are all important when considering

metallic coatings. In order to understand the reason for the different behavior of the galvanized iron and the tin plate, it is necessary to thoroughly understand what takes place when two metals are in contact. For the purpose of the present discussion we must consider four cases of metals in contact as follows:

1. In the presence of electricity.
2. In the presence of heat.
3. In the presence of corrosive agents.
4. Apart from any exterior agency whatever.

In the Presence of Electricity.

As regards the first case, it is important to note that copper conducts electricity better than does iron, iron better than tin, tin better than lead, lead better than zinc and zinc better than antimony. The metals first mentioned are negative to those which follow; iron is negative in relation to zinc and zinc is positive in relation to iron. The conductivities of these metals are the reciprocals of their resistivities; in other words, the better conductivity of copper over iron is due to the smaller resistance which it opposes to the passage of the electric current. Again, the better the metal conducts electricity the less capacity it has for storing it. This is the same as in the case of heat; the poorer the body as a conductor, the more difficult it will be to heat it, but the longer it will take to cool. The wooden handle of a silver teapot does not heat up as well or as rapidly as does the pot itself, but when the teapot is cooled the metal part cools quickest and becomes colder than the handle.

If, now, two metals, say iron and zinc, are put in contact and immersed in an electrically charged medium, the iron being the better conductor will not absorb as much electricity as the zinc, and there will exist what is known as an electromotive difference of potential. There will be a difference of electrical pressure between the iron and the zinc in contact, and therefore a steady current of electricity will flow from the zinc to the iron, and this current will be kept steady by the leakage which is directly proportional to the absorbing power. If no leakage were possible the potential of the two metals would reach the same level and they would be in electrostatic equilibrium equivalent to a closed circuit.

An apt comparison to what takes place would be that of two water tanks of equal dimensions, connected at the bottom and at the top by open pipes, and one tank having a larger intake at the top than the other. If both tanks are filled simultaneously by steady streams of water the tank with the larger intake will fill more rapidly and there will be a continual flow through the lower connecting pipe from the tank with the larger intake to the tank with the smaller intake to maintain the level. When the tanks are full they will be in equilibrium, and if they are turned upside down the outflow through the intake pipes will be proportionate to the previous inflow and the current will be reversed, passing from the tank with the small outflow to the tank with the large outflow in which the level is going down more rapidly.

It is this operation of maintaining, or rather the effort to maintain, the electrical level which produces the flow between metals of different conductivity when they are in contact and immersed in an electrically charged medium. The medium itself may be perfectly static, or at rest, but the flow from the iron to the copper will manifest itself as dynamic or moving electricity. Nothing in nature, be it material or immaterial, can be manifested to our senses unless there be a motion, a difference, a relation.

Electricity is always present on this planet, and everything is fairly impregnated with it. If, therefore, we bring two dissimilar metals into mutual contact we shall obtain a flow of electricity from one to the other, caused by an ineffectual effort to equalize potentials, which will produce sensible galvanic effects. The contact need not be direct. A suitable conducting connection, such as moist air, will act as an electrolyte and enable the action to take place, the space in between constituting what is known as a field of force. Besides atmospheric and telluric electricity we are often called upon to take into consideration, in our engineering problems, the electricity artificially produced for industrial and domestic purposes, the diffusion of which "stray currents," as they are called, will hasten the corrosion of water pipes and structural steel even when they are imbedded in concrete.

The reverse of the order in which I have previously placed the metals in relation to their conductivities, *i. e.*, antimony, zinc, lead, tin, iron and copper, indicates the positive direction in which the current will flow from metals having the higher to those having the lower potential. It is known as an electromotive series.

In the Presence of Heat.

The second case is that of metals in contact exposed to heat. The electrical conductivity of substances will vary with temperature, that of metals decreasing with an increase of temperature. There are notable exceptions to any generalization which might be attempted that the conductivity is inversely proportional to the temperature, and one of these exceptions happens to be iron.

When two metals in contact are subjected to heat, the voltaic or galvanic action of which I have spoken will be influenced either favorably or unfavorably because the thermo-electric series is different from the electro-motive series which I have given you. The thermo-electric series runs as follows: Lead, tin, copper, zinc, iron and antimony. The order of these metals indicates the direction in which the current tends to flow with an increase of temperature. This tendency may be—and is in most cases—exhibited as either a resistance or as an aid to the electromotive current; for instance, increase in temperature will reduce the current from zinc to iron in a lesser degree than from antimony to iron. This principle has been used in the construction of electric pyrometers in which the variation in the temperature of a couple formed of dissimilar metals is recorded very sensitively at a distance from the source of heat, by means of a galvanometer.

The galvanic effect between metals is, therefore, modified in a very complicated manner and to a considerable extent by the temperature at the point of contact. This galvanic action seems to be intimately related to the natural tendency toward chemical action exhibited by all substances in contact and to that chemical affinity which exists to some degree or other between all kinds of matter.

In the Presence of Corrosive Agents.

The third case is that in which corrosive agents are present which attack both of the metals. A decrease of electrical potential seems to aid chemical action and an increase of this potential opposes it. The metal toward which the flow of current is directed is, so to speak, oversaturated on account of the persistence of effect which, when it refers to magnetism, is called hysteresis, and its potential is greater than normal. The flow of current from zinc to iron will oversaturate the iron and will prevent its decomposition, when it is exposed to corrosive influences, whereas the zinc which is undersaturated is in poor physical condition to withstand chemical attacks. It will decompose into oxide and carbonate more rapidly than if it were out of contact with the iron.

If only one of the metals is attacked by the corrosive agents under normal conditions there will be no galvanic protection, and this is why nickel plating, which is unaffected by ordinary atmospheric conditions, is nothing more than a protective skin, and if it is partially removed the exposed surface of the iron will rust very readily. Copper plating is no better, and if the iron is exposed the galvanic action is slightly unfavorable, because the copper is in negative relation to the iron. Copper rolled over iron and then drawn forms a good protection, but in this case the iron is nothing but a core. Lead would be a good coating metal if it were only harder and more readily attacked by acids.

Apart from Any Outside Agents.

The fourth and last case is that of metals in contact without any exterior agents being taken into account. Careful investigation has shown conclusively that if two metals are placed in close contact there will be a slow exchange of molecules, which will result in the metals alloying at their surface. If great pressure is applied during this exchange the metals may be actually welded

together. This action does not take place in a minute, nor even in a day or a month. It is very wonderful what pressure will do; certain salts in a finely powdered state have been compressed beyond a critical point where the cohesion became equal to that of the substance before it was pulverized, and even transparency was recovered. What enormous power must exist within the atom to bring about the same results by rapid and unimpressive reactions, such as the recovery of crystals by dissolving a pulverized substance and then evaporing it!

This exchange of molecules between metals in contact is a simple case of diffusion. The diffusion of metals takes a great deal longer than that of liquids or gases because the internal friction is vastly greater. If the molecular cohesion is reduced by fusing the metals the alloying will take place as readily as when whisky and water are mixed to form the alloy which is known as a "high ball." If the metals could be brought to a state of vapor the diffusion would be practically instantaneous, and even if only one of the metals were in a state of vapor this should hasten the process to a considerable extent. I must ask you to take good note of this statement because it has a very important bearing on the process and nature of dry galvanizing.

The effect of pressure is to hasten the action, but diffusion will always take place between metals provided there is some kind of contact. According to this theory the metals of alloys should become more thoroughly incorporated with time, and a zinc coating which has passed through the early stages of its existence without being destroyed should, like wine and love, improve with age. The two metals should gradually become alloyed at their surface of separation. If the old Ninevites or Egyptians had produced galvanized work there would be people to worry over the lost art of alloying iron and zinc just as others still persist in claiming that some useless art of hardening brass has been lost, although it has not even been proved as yet that it ever existed.

Specifications for an Ideal Coating.

On looking back at the four cases of metals in contact, which I have discussed, you will readily see that all are closely related, and that they must in all normal cases be present at one and the same time. What, then, are the specifications for an ideal metallic coating for iron?

1. It must be as far as possible from iron toward the positive end of the electromotive series and must fulfill the same requirements in the thermo-electric series.

2. It must be affected by the same agents which corrode the iron.

3. It must present as large a surface as possible to the corroding agents.

4. It must be in very close contact with the iron.

Zinc is, of all the commercial metals, the one which most closely fulfills the first and second requirements; the third and fourth, in regard to surface exposed and contact with the iron, are matters of process, and I shall, therefore, now proceed to describe the various processes which have been used to apply zinc to metal surfaces. But before doing so I would point out that all the principles which I have enumerated apply as well to the salts of the metals, and that is undoubtedly one reason why red lead and zinc white give such good protection against corrosion.

Cold Galvanizing.

In the early years of the last century the process of electrolytic zincing, which is nowadays known as cold or electro-galvanizing, was first discovered, but until about 10 years ago the lack of suitable equipment prevented its commercial application. The articles to be treated by this process are first thoroughly cleaned of scale, rust and grease by an acid pickle, sand blasting, hot lye or by other means, singly or in combination, and are then placed as cathodes in a solution of some salt of zinc—usually the sulphate—in presence of zinc anodes which regenerate the solution, while a current of low voltage is passed through the arrangement and deposits zinc from the solution upon the articles. Numerous factors must be taken into account: the composition and temperature of the bath, the voltage and density of the current, the quality, shape and position of the anodes and many other points which are all of prime importance if the results are to escape first criticism and then corrosion.

The surface of an electrically galvanized article is mat or frosted, provided the work has been properly done. It always shows a few pores. If improperly done, or if the work was not perfectly clean before treatment, it is either honeycombed with pin holes or spongy. Above a certain limit of thickness below which the coating is worthless, first-class electro-galvanizing is superior to hot galvanizing, and it is cheaper to produce where automatic machinery can be employed, although less zinc is deposited than by a hot dip. This is no doubt due to the better contact between the zinc and iron.

Hot Galvanizing.

Sixty years ago the process of hot galvanizing was introduced on a commercial scale. It consists in dipping the articles into a bath of molten spelter, with or without other metallic additions, at temperatures ranging from 750 to 900 degrees F. The articles must be first cleaned, as for electrolytic work, but a slight falling short of perfection does not have such disastrous effects on the quality of the result. Very heavy pieces may be heated before dipping, so as not to chill the bath. The coating is crystalline or amorphous, and does not adhere as perfectly as does the electrolytic one. Properly treated sheet metal goods have an attractive spangled appearance, but most articles look like castings and sharp edges are lost. Metallic chlorides are used as fluxes. They are expected to remove the injurious salts of iron left by the pickling, but it is a question if it is not another case like the introduction of rabbits in Australia, and if they themselves are not the main cause of the decay, which starts underneath the coating in hot galvanized work.*

Dry Galvanizing.†

The latest process for applying a zinc coating is the dry process, and I am going to endeavor, not only to describe the process itself, but to show also how it fulfills the requirements which I have indicated; how it permits the extension of galvanizing to articles which have never been protected in this manner, and how by divulging the mystery of the nature of zinc dust it permits us to speculate along new lines in metallurgy, which may lead to the discovery of some principles of great industrial value.

The process of dry galvanizing or Sherardizing metals was awarded a gold medal at the St. Louis Exposition of 1904, and the president's gold medal for 1905 was presented to its discoverer by the British Society of Engineers. The inventor, Sherard Cowper-Coles, is one of the most eminent metallurgical engineers in Europe, and is well known for his reintroduction on a commercial scale of the process of electric galvanizing, the regeneration of electrolytes by the coke and zinc dust filter, the electrolytic spinning of copper into sheets, wire and other forms, and innumerable other inventions and improvements in connection with the electro-deposition of metals.

The Practice of Dry Galvanizing.

For the purpose of Sherardizing the articles are placed after cleaning in a retort, usually a drum, and are covered with zinc dust, which is commonly called blue powder, and is the flue dust, and, therefore, a by-product of the zinc smelting furnace, known as the Belgian furnace. It contains, as a rule, from 75 to 90 per cent. of pure zinc. The supply of zinc dust is ample at a price below that of spelter, and if the demand increases is can be produced in any quantity that may be required. A small amount of powdered charcoal is added to prevent oxidation of the zinc by the air inside the retort at the beginning of the operation, and the receptacle is closed and heated to a temperature about 200 degrees below the melting point of zinc.

Ideal conditions would obtain if the air were exhausted from the drums. Where the size of the plant warrants the control of the zinc dust consumption to within so fine a margin, the drum might be filled with some inert gas, such as carbonic dioxide, which is supplied to soda

* The fumes given off in hot work are injurious to machinery, and in a manufacturing concern it is necessary to erect a separate building for this work.

† Patented.

fountains and other users in steel cylinders at a very low cost. It is, however, to be feared that if the temperature is allowed to go too high the carbonic dioxide might act as an oxidizer on some of the dust.

By Sherardizing, a homogeneous deposit of zinc is obtained, varying in thickness according to the length of time, its lower portion being an alloy of zinc and iron or of zinc and copper, as the case may be. In the case of copper the alloy is a true and hard brass. The drum is occasionally turned a fraction of a revolution to insure an even coating where the articles are crowded together, and the heating may last from a few minutes to several hours and two or three drums can be used in connection with one furnace.

A Sherardized surface resembles in general appearance an electrically coated surface. It is, however, of a soft silver gray, more lustrous and metallic and, on that account, it is to most people more pleasing to the eye, and it is distributed with great uniformity, which is not the case in hot galvanizing. Whereas in hot galvanizing the amount of zinc which is alloyed to the metal of the article is very small, and most of the coating forms an exterior perishable skin, in Sherardizing the coating is thoroughly incorporated with the metal which it protects, forming an alloy having the appearance of pure zinc but much harder and more durable. It is on account of this thorough alloying that the protection afforded by dry galvanizing is so superior to that afforded by either hot or electric galvanizing. The zinc having penetrated the iron the old surface cannot be recovered by either chemical or mechanical means.

If an excessive amount of zinc is deposited by Sherardizing, the outside surface is composed of zinc somewhat hardened by the presence of a small percentage of iron, and zinc dust accumulates and clusters in a way which renders the surface rougher and much less attractive in appearance under magnification than it is to the naked eye. No special advantage is derived from the additional expense unless the conditions under which the articles are to be used are exceptionally severe.

The process of dry galvanizing is not confined to zincing; the dusts of antimony and of other metals can be used in a similar manner. The fact that zinc dust, even at temperatures higher than its melting point, does not melt or cake is of great value in Sherardizing, as it eliminates the danger of spoiled work from carelessness in handling the temperature. Furthermore, zinc dust containing as little as 35 per cent. of pure metal can be used. The presence of the oxide is probably necessary, as it seems to play a part in the process.

Some Anomalies in the New Process.

But why is it that zinc dust acts in this peculiar manner, depositing zinc at a temperature several hundred degrees below its melting point, and why is it that the comparatively cold zinc alloys itself to the iron or other metal when the molten zinc of the hot process fails to do so, or at best only does so in a cumbrous, limited way? I can only answer these questions by giving you my own theory of the nature of zinc dust and of its action under the conditions of dry galvanizing. This theory is quite new to the very best of my knowledge and was not published by me until quite recently.* It is founded on observed facts but is not entirely empirical, because so far it has seemed to satisfy all the theoretical tests to which I have been able to put it and it answers a number of unexplained phenomena which I shall mention later.

(*To be continued.*)

C. E. Muller & Co., Ltd., Middlesbrough, England, selling agents in Great Britain for the iron ores of Swedish Lapland, state that owing to the policy adopted in Sweden of restricting iron ore exports a number of British consumers will be left with short supplies of Swedish ore during the coming year. It is added that no further export shipments of the rich low phosphorus Swedish ores known as "A" Kiruna and "A" Gellivare will be made, since it has been decided to retain these ores exclusively for home consumption.

* *Electro Chemical and Metallurgical Industry*, May, 1907.

To Test Explosives Used in Coal Mining.

The United States Geological Survey within a few weeks will establish, probably in the Pittsburgh District, an experiment station for the purpose of testing explosives used in coal mining, the ultimate object being, if possible, a reduction in the number of mine disasters resulting from gas and coal dust explosions. Miners' safety lamps will also be tested at this station. Explosives investigations will be conducted both in the laboratory and in the mines.

The station will consist of an explosive gallery, rescue room, observation house, lamp testing rooms and explosives laboratory. The gallery is to be made of boiler plate, and will be in the form of a cylinder, 100 ft. long and 6 ft. in diameter. A series of safety valves on hinges will be arranged along the top to allow the escape of gas following an explosion. Port holes along the sides, covered with ½-in. plate glass will allow those in the observation house to see whether an explosion has taken place in the gallery during the tests. The cylinder will be filled with firedamp and air, or coal dust and air, and the explosives will be hurled into the gallery by means of a steel mortar fired by electricity from an observation house 60 ft. away. The firedamp and air will be thoroughly mixed by an electrical fan.

Tests will be made with various explosives, and the maximum quantity of each explosive that can safely be used in mines will be published under the head of "permissible explosives." Explosives known as "safety explosives," in which the temperature at the point of detonation is low and the flame of short duration, will have a higher "limit charge" than the less safe explosives. The rescue room will resemble the interior of a mine and during tests will be filled with smoke. The efficiency of all apparatus for sustaining life will be determined by a series of tests. Miners will be shown how to rescue their fellow miners.

All explosives will be first tested by the Pendulum test and the Trauzl test, to arrive at the quantity to be used in making experiments in order to get the same disruptive force. In the Pendulum or English test, a large pendulum weighing several tons swings backward when the force of an explosive is exerted upon its face. The distance of the swing is indicated by a delicate sliding rule. The explosive is fired from a mortar and the force of the explosion is played against the face of the pendulum. The Trauzl test uses a cylindrical lead block 20 c. m. high and 20 c. m. in diameter. The weighed explosive with the electrical detonator is placed in this central cavity and tamped with a known quantity of sand and moist clay. After the charge has been exploded the pear shaped expansion of the bore is measured by filling it with distilled water at 16 degrees C.

A pressure gauge will be used for measuring the actual pressure in pounds per square inch developed by the detonation of various explosives. The analysis of the products of combustion will also be made. The heat of decomposition of all explosives in terms of calories will be ascertained by detonating large quantities in a bomb. The explosives will be fired from the mortar at night, and the length of the flame will be determined by photography. The time of the flame will also be determined by an electrical apparatus. The rate of detonation will be determined by an electrical rotary recording drum. Actual experiments will be made in mines to lessen the waste of fuel in mining operations. Different methods of using explosives in mines will be investigated with special reference to increasing safety and efficiency.

The experiments will be under the direction of Joseph A. Holmes, chief of the technologic branch of the Geological Survey. Dr. Charles E. Munroe has technical supervision of the tests which will be conducted at the station. Clarence Hall, explosives expert for the Geological Survey, assisted by W. O. Snelling, will have immediate charge of the experiments. Mr. Hall has recently returned from Europe, where he made a study of the foreign government testing stations.

British Electrically Equipped Shipbuilding Berths.

John Brown & Co.'s yard at Clydebank is equipped with vertical derricks, 100 ft. apart, capable of lifting a load of 5 tons to a hight of 125 ft. from the ground. The mast is a braced column 130 ft. long. It is square in section, having a side of 6 ft. at the center and tapering toward the ends. The jibs are also of square section. Hoisting is accomplished by a 35-hp. electric motor, while the jib is slewed by a 10-hp. motor.

At Palmer's yard, Jarrow-on-Tyne, England, is a system of overhead cableways upon which electrically operated trolleys run.* These cableways are supported by carriages held by braced supports, 125 ft. above the berth, which allow them to be traversed across the berth while the trolley itself runs longitudinally. All the motions of longitudinal and lateral hoisting in handling materials are accomplished by electric motors. The cable span is 490 ft.

The Dalmuir dock of Beardmore & Son is supplied with overhead traveling cranes run on a large gantry, the two sides of which are braced together, and may be roofed over for protection from the weather. The side braces are also provided with side walking cranes, which travel along them, working from any point. These are capable of handling loads of 5 tons at a radius of 30 ft. The traveling cranes have a span of 108 ft., a total travel of 750 ft. along the berth, and are capable of lifting 15 tons to a hight of 140 ft. Power for all of these operations is supplied by electric motors. In the storage yard of the same plant is a long electric cantilever crane for handling plates. This is carried on a gantry, and has a total travel of 240 ft. and a clear lift of 22 ft. above the rail.

The plants of the United Sheet & Tin Plate Company at Marietta, Newcomerstown and Byesville, Ohio, will be offered for sale by the receivers at Marietta, June 4. The property was offered for sale April 30, but there were no bidders. It has since been reappraised.

* This was illustrated and described at some length in *The Iron Age* February 22, 1906.

The Dallett Motor Driven Boiler Shell Drill.

The latest development in machines of its character is a new boiler shell drill built by the Thos. H. Dallett Company, Philadelphia, Pa. This machine, which is shown in the illustrations herewith, is motor driven throughout and has been designed for the special purpose of taking advantage of high speed steel drills.

As will be seen in Fig. 1 there are two end housings, on the front face of which, carried by vertically adjustable brackets, are two 5-in. bars balanced by two counterweights. These bars carry two independent motor driven drill heads, and may be raised and lowered through a vertical range of 6 ft. by means of screws actuated by a motor on the top rail of the machine. This motor is controlled by a reversible regulator on the inside of the housing which does not appear in the engraving.

A feature of importance is the central position of the spindle, with relation to the bearings of the drill head and bars. As a result the pressure of the drill against the work has no tendency to set up torsional or endwise strains in the drill head or bearings which would cause excessive friction of the drill in the hole, rapid deterioration of the drill and undue consumption of power, due to the spindle being thrown out of alignment. The latter is bound to occur if the drill spindle is not central of its supports.

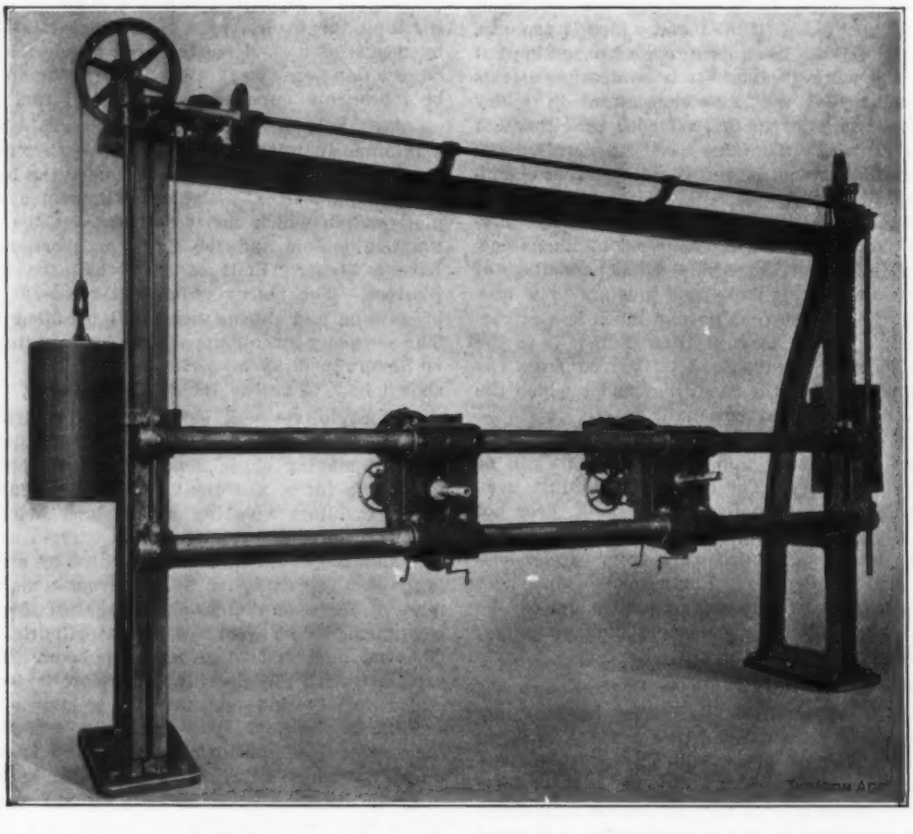


Fig. 1.—The New Motor Driven Boiler Shell Drill Built by the Thomas H. Dallett Company, Philadelphia, Pa.

The machine is entirely self-contained; all adjustments are effected by crank handles and hand wheels, no wrenches being required, and the operator has all the adjustments of the drill head at his command from either side of the drill head without moving from his position. In the lowest position of the carriage the centers of the spindles are 21 in. from the floor, and in its highest position they are 7 ft. 6 in. The distance between housings is 14 ft., and the distance between spindle centers when the drill heads are in the outermost position is 12 ft. The length of the standard machine over all is 17 ft. 8 in.; the hight, 11 ft. 6 in., and the total weight, 12,000 lb.

Fig. 2 shows one of the drill heads with its individ-

ual motor and illustrates the method of mounting the gear frame on trunnions. As will be seen, the drill head has a vertical adjustment in itself (6 in.), obtained through a crank handle at the bottom, and is moved along the bars by pinion and rack on the under side of the lower bar. The motors on the drill head are Northern 2-hp. variable speed motors. The regulating box and switch are mounted on the opposite side of the motor from that shown in Fig. 2. There are no bevel gears in the transmission from the motor shaft to the spindle, spur gears only being used, making a very durable and efficient gear reduction. The spindle speeds range from 80 to 160 rev. per min., and the whole mechanism of the drill head is especially designed and built for the purpose of using high speed steel drills if desired.

The spindle is 1 13-16 in. in diameter, is bored for a No. 4 Morse taper, has a traverse of 18 in. and may be swung in a vertical plane through an arc of 15 degrees to permit drilling rivet holes radially toward the center of the boiler, which while being worked upon is mounted on rollers in front of the machine. The swinging movement is controlled by the hand wheel, which appears immediately beneath the reducing gears. In Fig. 1 one drill head is shown with the spindle in a horizontal position, and the other with it inclined upward.

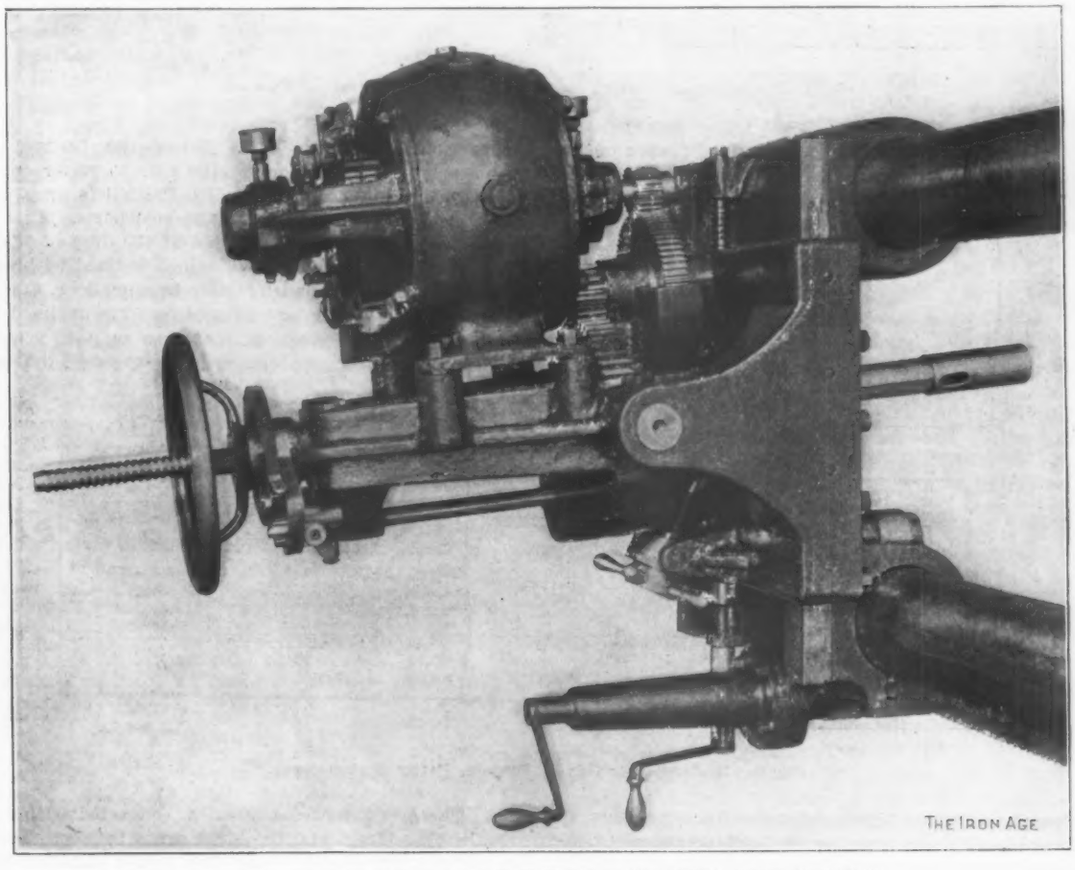


Fig. 2.—A Nearer View of One of the Drill Heads on the Dallett Boiler Shell Drill.

The feeding mechanism consists of a feed shaft, crank head, rocker pawl plate, pawl, ratchet wheel, feed nut and feed screw, the thrust of the latter being directly upon the back end of the spindle. The connecting rod between the crank and rocker plate is fitted with a spring which can be set for any pressure of feed. It is impossible for this pressure to be exceeded, as the spring is compressed when the limit is reached and the feed ceases to operate until the pressure is reduced, thus making an automatic relief. Change of feed is effected by shifting the thumb latch around the crank head, and a range of feeds from 0.005 in. per revolution of spindle to 1-16 in. can be obtained. This range of feeds covers the requirements of drilling in boiler work.

The Delaware River Iron Shipbuilding Company, Chester, Pa., on May 11 launched the steamship New Haven, building for the Consolidated Company. This vessel will be used in the freight service between New York and New Haven, is 293 ft. over all, has a 45-ft. beam, and will have a carrying capacity of 1200 tons.

Pennsylvania Business Legislation.

HARRISBURG, PA., May 22, 1907.—Owing to the defeat of the proposed regulations for the employment of children or minors in the industrial establishments of the State of Pennsylvania, the Department of Factory Inspection has been compelled to put into effect the provisions of the act of 1901, which had been superseded by the act of 1905, which, however, was declared to be unconstitutional by the State Supreme Court. Instructions to this effect have been sent to all of the deputy inspectors in the State, including those where there are iron and steel mills, factories, glass plants, cement works, &c. Speaking of the matter, Chief Inspector Delaney says:

"The requirements of the old act, which now becomes effective because of the decision and through the failure of the Legislature to pass the bill presented early in the session, are few and simple. An affidavit of the age, date and place of birth of the child desiring employment is to be made by the parent or guardian, and this must be kept on file by the employer and be returned to the child when employment ceases. School teachers have no right to issue affidavits. The law prohibits the employment of children under 14, and only between 14 and 16 under the above quoted law. Until a new law is passed this law will be strictly enforced about all works."

The Governor has as yet acted upon few bills passed by the Legislature. He has until June 16 to dispose of them, and it is understood that he will grant hearings at which arguments can be presented for or against signing the proposed employers' liability law and the railroad commission bills, which are the chief matters of interest to manufacturing concerns. He has also in his hands several bills which will enable extensive rebuilding and new building of county bridges, and a bill to limit car storage charges to $1 per day per car.

A Continuous Heating Furnace.

Harry Parrock, Youngstown, Ohio, and Willis McKee, Elyria Iron & Steel Company, Elyria, Ohio, have been granted a patent on a continuous heating furnace of new design. The aim of the inventors was to secure a better distribution of the flame and gases and provide against the drawback resulting from the closing of exit ports by the feeding in of the billets. Further improvements are the provisions for an effective feed out arrangement, for thorough mixing of air and gas and a reduction in the number of valves.

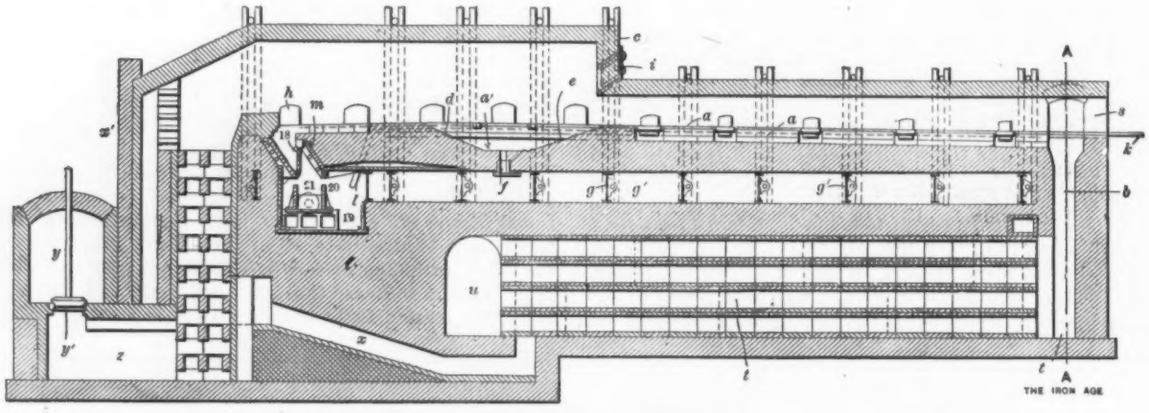


Fig. 1.—Longitudinal Vertical Section of Continuous Heating Furnace.

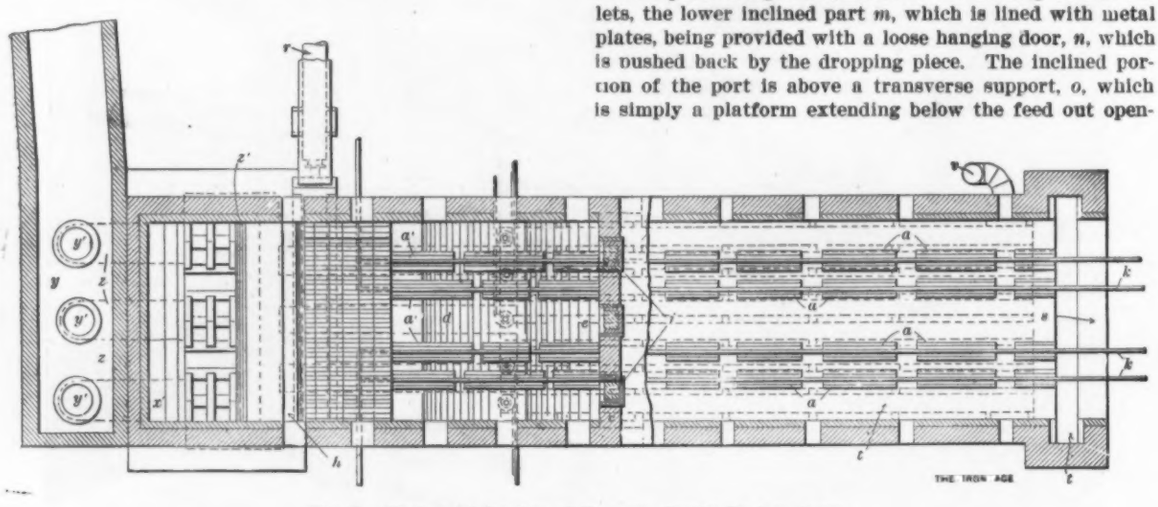


Fig. 2.—Horizontal Section of Furnace, Partly Broken Away.

The construction of the furnace is shown in Fig. 1, a longitudinal vertical section. Fig. 2 is a horizontal section partly broken away. Fig. 3 is a cross section on the line A A of Fig. 1, looking in the direction of the travel of the billets through the furnace. The letters *a* indicate the longitudinal piers of the furnace, these extending from the transverse outlet flue *b* to the hearth. They are cut through transversely at several points to allow freer circulation of the gases. Between the cross arch *c* and the port *b* they are cut through or nearly to the line of the furnace floor, while the piers *a'* are only partly cut through, so that the recess extends only a portion of their depth. The vertical cross arch *e* divides the furnace space into two sections, providing a high space in the combustion chamber and suddenly reducing the space for the passage of the gases, so that the heat is concentrated upon the moving train of billets. The cross arch is provided with cleaning doors which have a downward inclination and are closed by covers, *i*.

It will be noticed that opposite inclinations of the furnace bottom are provided at *d* and *e* and at the end of these inclines are holes, *f*, through which scale from the billets drops into the open space *g* below the furnace bottom.

Water cooled pipes, *k*, extend along the longitudinal piers of the furnace and over these the billets slide. The pipes extend downward through the hearth at their inner ends, as shown at *l*. Below the furnace bottom the pipes are led out to the side to water connections. The port *h*, through which the billets drop, is located between the hearth and the fuel ports. An angle in this port changes the direction of the drop of the billets, the lower inclined part *m*, which is lined with metal plates, being provided with a loose hanging door, *n*, which is pushed back by the dropping piece. The inclined portion of the port is above a transverse support, *o*, which is simply a platform extending below the feed out opening. There is a forked pusher, *p*, connected with a hydraulic cylinder, *r*, and the billet drops between the legs of the fork, the pusher being then moved endwise, delivering the billet on a conveyor outside of the furnace.

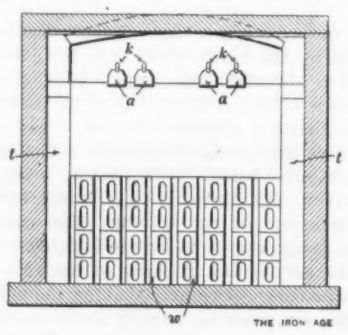


Fig. 3.—Vertical Cross Section on the Line A-A, Fig. 1, Looking Toward the Left.

The port *b* is made to extend across the furnace. It is also widened at the top and at the ends is enlarged to form the offset portions *t*. These extend into the side walls and form extensions of the port leading down into

the double surface regenerator *t'*. This construction gives the gases free exit beyond the ends of the billet, thus preventing the choking of gases as the billets are pushed through the opening *f*. From the regenerator *t'* the products flow to the left in Fig. 1 and pass out through the flue *u*, while the air which enters through the pipe *v* and flows in sheets between the bricks *w* (Fig. 3) passes through the flues *x* and around to the flue *x'*. The gas enters through the flue *y* and passes through valved openings, *y'*, into the flues *z*. It then rises through a divided checkerwork chamber and unites with the hot air in the chamber *z'*, from which the products of combustion pass through the length of the furnace to the offtake flue.

The features of the invention on which special claims are made are the portions of the offtake flue projecting beyond the ends of the billet, the provision of the longitudinal scale cavities, and the arrangement of the forked pusher and feed out opening.

The Amalgamated Scales.

The Amalgamated Association, in session at Toledo, Ohio, has made public the new wage scale for boiling and heating, which will be presented to the bar iron mills in the Central West that sign the Amalgamated scale, these being few in number and owned mostly by the Republic Iron & Steel Company. The new scale is to be effective for one year from July 1 next, and is based on the same rate as the present scale, *i. e.*, $5 per ton for boiling on a 1 cent card for bar iron. However, under the new scale, wages of puddlers are to advance 12½ cents per ton for every advance of 1-20 cent in the price of bar iron after it reaches 1 1-20 cent per ton. For purpose of comparison we append the present and the proposed boiling scales, both of which are based on actual sales of bar iron as per conference agreement, as follows:

PRESENT SCALE.

Price of bar iron. Cents.	Wages per ton, 2,240 lb.	Price of bar iron. Cents.	Wages per ton, 2,240 lb.
1	$5.00	1 6-10	$6.00
1 1-10	5.00	1 7-10	6.25
1 2-10	5.00	1 8-10	6.50
1 3-10	5.25	1 9-10	6.75
1 4-10	5.50	2	7.00
1 5-10	5.75		

NEW SCALE.

Price of bar iron. Cents.	Wages per ton, 2,240 lb.	Price of bar iron. Cents.	Wages per ton, 2,240 lb.
1	$5.00	1 11-20	$6.37½
1 1-20	5.12½	1 12-20	6.50
1 2-20	5.25	1 13-20	6.62½
1 3-20	5.37½	1 14-20	6.75
1 4-20	5.50	1 15-20	6.87½
1 5-20	5.62½	1 16-20	7.00
1 6-20	5.75	1 17-20	7 12½
1 7-20	5.87½	1 18-20	7.25
1 8-20	6.00	1 19-20	7.37½
1 9-20	6.12½	2	7.50
1 10-20	6.25		

It will be seen that under the proposed scale, when bar iron reaches 1½ cents per pound, boiling will be $6.25 per ton, while under the present scale, which expires on June 30, the rate is $5.75 per ton, the new scale showing an advance of 50 cents per ton. How this advance will appeal to the bar iron mills that sign the scale remains to be seen, but the chances largely favor its refusal, and this was no doubt in the minds of the Amalgamated Association officials when the higher scale was drawn up. There is a well grounded belief that a higher wage rate for puddling has been decided upon to placate the puddlers in the Amalgamated Association. The revived order of Sons of Vulcan has formed lodges in some of the bar iron mills in the West, and organization work is still going on, but with only fair success, many of the puddlers refusing to leave the Amalgamated Association to affiliate with it, believing the owners of the bar iron mills would refuse to treat with two labor organizations that would be arrayed against each other, and which no doubt would cause endless disputes among the men. However, the Amalgamated Association officials have been greatly worried over the dissatisfaction among the puddlers in its ranks, and it was to allay this dissatisfaction that the puddling rate in the new scale has been advanced, but with little hope in the minds of the makers of the new scale that it will be granted.

The Amalgamated Association has made many serious mistakes that have cost it dearly, both in the loss of mills and in a financial way as well. If this advance is insisted upon it will be adding another to these mistakes, and one that is likely to prove as costly as its predecessors. No change was made in the scale for muck rolling, which remains at one-eighth the straight price of boiling, but in the scales for piles on boards and bushelling on sand bottom the same ratio of an advance is asked as in the boiling scale.

An English Coaling Station.

The Steamship Owners' Coal Association has erected at Purfleet, England, a large coaling station, which involves a reinforced concrete pier and two rapid working hydraulic transporter cranes, fitted with grab buckets. The pier, which is 400 x 34 ft., is parallel with the shore line, and 200 ft. from it. The cranes are designed for lifting coal from barges and delivering, either into a steamer alongside, into a barge on the river side of the steamer, into a barge on the land side of the pier, or into trucks or cars running on rails on the pier, beneath the cranes. Each crane has four legs, each of which is carried on an eight-wheel truck, the track gage being 28 ft., and the wheel base 24 ft. The trolley runway tracks are carried at a hight of 32 ft. above the pier, the outboard runway having an overhang of 48 ft., while the total travel of the trolley, from extreme outboard position to extreme position on the land side of the pier, is 96 ft.

The trolley runway is fitted with a weigh bridge, by which it is possible to weigh each grab bucket of coal as it is taken out of or discharged into a vessel. The entire operation of the crane—lifting, lowering, and traversing—is by hydraulic power. The hydraulic pressure is supplied by a 120-hp. pumping plant at the shore end of the approach pier. The hoisting and trolley traverse movements are operated by large hydraulic cylinders controlled from an operator's station, while the crane is run along the pier by a three-cylinder rotary hydraulic engine. The nominal capacity of each crane is 50 tons per hour, but in practice 70 tons has been exceeded.

The Gayley Process and the Bessemer Steel Rail.—The suggestion has been made that the application of the Gayley dry air process to Bessemerizing would do much toward meeting the somewhat hysterical condemnation of Bessemer steel prevalent among some railroad engineers. The mixer now universally used has in one direction thoroughly minimized one source of fluctuations in the character of the process from heat to heat. The range in silicon contents in the iron charged in successive heats has become very narrow, so that, so far as the silicon contents and the initial temperature influence the blow, conditions are rarely identical day after day and month after month. This is particularly true of the temperatures. The one variable factor is the amount of moisture introduced with the blast. Of course the blower can detect the influence of such variations, but, after all, the human eye is a poor pyrometer. It is believed by eminent metallurgists that greater uniformity in product would be obtained if the only remaining variable in the conduct of the blow—the moisture in the air—were removed by the Gayley dry air process. Then blow after blow, day in and day out, the Bessemer process would be carried out under substantially like conditions and practice would as nearly approach perfection as is possible in a metallurgical operation.

Two new turbine driven steamers for the Southeastern & Chatham Railway are being completed in England by Denny Brothers. The new ships will each accommodate 1200 passengers. The length is 324 ft.; beam, 42 ft.; draft, 10 ft.; gross tonnage, 1670; horsepower, 9000, and speed, 22½ knots. This is a size and type which has become very popular in Great Britain for Channel services, where the runs are from 1 to 3 or 4 hr.

The Temple-Ingersoll Electric-Air Drill.

Electric means of driving a percussion rock drill have long been desired, but have never been satisfactorily offered in a purely electric drill. In what is known as an electric-air drill, the Ingersoll-Rand Company, New York, has effected a compromise between an electric drill and an air drill which seems to successfully combine the advantages of both without their disadvantages. The drill itself is substantially an air drill, but is very different from the usual forms, and the power is transmitted as electric current to the portable plant.

An electric-air drill in actual work is shown in Fig. 1.

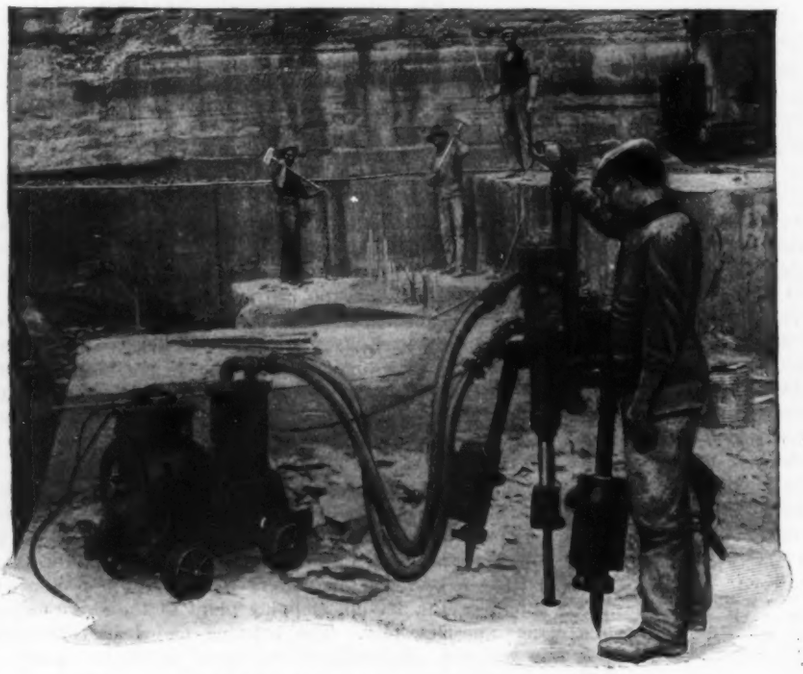


Fig. 1.—The Temple-Ingersoll Electric-Air Rock Drill in Use.

with all the apparatus pertaining to it. The drill may be mounted upon a tripod, bar or column in the usual way and combines the ordinary drill cylinder and piston, the latter carrying the bit or steel which does the actual rock cutting. As may be seen in Fig. 2, a section of the drill, the cylinder slides in a shell, being moved by a hand operated feed screw. Near each end of the cylinder there is a projecting boss for attaching a hose, with free, direct openings into the cylinder. The piston is short and the piston rod, which runs in a long sleeve extension, is much larger than in the usual air drill, so that no enlargement for the chuck is required on the rod. The chuck used is a special self-tightening device which fits the taper end of the rod.

The little truck, accompanying each drill, carries a small direct or alternating current electric motor, which through reducing gears drives a shaft with cranks on each end that reciprocate two vertical single acting trunk pistons in corresponding air cylinders. Each of these cylinders is connected by a short length of hose to one end of the drill cylinder. The air thus enclosed in each air cylinder, its hose and the connected end of the drill cylinder, is never discharged or changed, but plays back and forth as the pistons move. The air cylinders are thus not compressors but pulsators. The entire apparatus in normal working condition is filled with air at about 30-lb. pressure, which pressure is automatically accumulated and maintained by simple devices under the control of the operator when the drill is running. As the cranks revolve, the pistons in the pulsator cylinders act in opposition, one stroke raising the pressure on one side of the drill piston and reducing it on the other, while the return stroke reverses the conditions, causing the drill piston to reciprocate.

This arrangement results, it is claimed, in a much simplified apparatus and a much reduced cost of maintenance. The usually most expensive and troublesome parts of the air drill are eliminated. There are no main valve, valve operating devices, tortuous air ports nor minute air valve passages, no split front head, buffers nor yielding head fastenings, no springs nor side rods, and not even a throttle valve. The pulsator cylinders, which take the place of the air compressors, have no inlet or discharge valves, and do not require a water jacket, as the cylinders have no tendency to heat up. The drill and pulsator comprise everything beyond the wires which connect with the generator at the power house.

The changes in operation and in the results accomplished show several surprising things. The electric-air drill strikes a fiercer and livelier blow than does the standard air drill, partly because the piston is air cushioned at each end, so that it starts its stroke impelled by a certain force saved and brought over from the preceding stroke. Then when it begins to move there is a simultaneous reduction of pressure in advance of the piston and an increase of pressure behind it, both conditions the reverse of those of the air drill. The critical point of the stroke at which the greatest force can be realized for the blow upon the rock is more precisely located in this drill, but the operator soon realizes this by instinct and adjusts his feed accordingly.

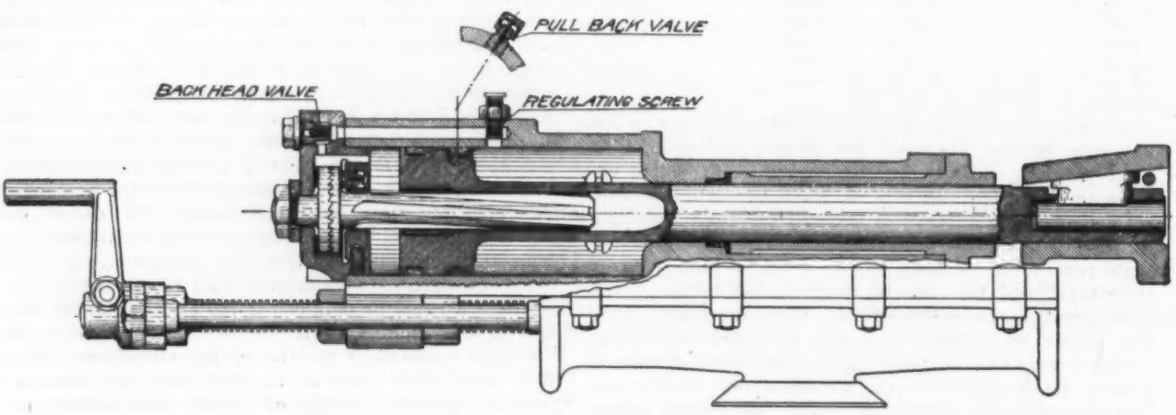


Fig. 2.—Longitudinal Section of the Drill Cylinder, Showing Its Interior Parts.

Perhaps the most astonishing result with the electric-

air drill is the reduction in power consumed. It is claimed to have been practically demonstrated that the power used measured at its source in the power house is only one-third to one-fourth that usually required. A 5-hp. motor drives an electric air drill equivalent to a 3¼-in. air drill, the latter when most effective requiring 20 or more horsepower at the compressor. The same air is used over and over again, its expansion force is fully employed, there is no filling of large clearance spaces and there are no thermal losses. Freezing up of the drill cannot occur as the air cannot accumulate moisture, and its temperature never falls low enough. The air carries oil to every part of the drill, and the lubricant as well as the air is used over and over without waste.

The motor runs at constant speeds, there being two speeds available with the alternating current and four speeds with the direct current type. The drill piston, of course, makes a stroke for each revolution of the crankshaft. When the drill sticks in the hole the pulsator continues to exert its alternate pulls and thrusts at the usual speed, say 400 per minute, which is very effective in yanking the bit free again, when the drilling is resumed.

The drills are now built in two sizes: 5-C, equivalent to a 3¼-in. air drill, and 4-C, comparing with a 2½-in. drill.

Cast Thread Fittings.*

BY HENRY B. CUTTER, SENECA FALLS, N. Y.

The principle and method of making gray iron castings with threads cast in them was evolved by George Cowing, of Cleveland, about 1878. The development of such castings was coincident with that of the pump industry, in which Cowing & Co., Seneca Falls, N. Y., were leading factors. This method was applied to the manufacture of pumps where different parts were to be screwed together, and was employed exclusively by this company from its inception to the practical abandonment of the business. It was found to be a marked point of economy in manufacture. While originally applied as stated, since the organization of the Cast Thread Fitting & Foundry Company the idea of making gray iron fittings with cast threads has been carried to a much higher degree of perfection than had previously been thought possible, both as to quality and economy in methods of production.

Recent tests with a number of these fittings screwed together with wrought iron pipe having standard gauge cut threads, the joints being made up without the use of any dope other than lubricating oil, showed no indication of break down under a pressure of 900 lb. to the square inch.

Erroneous opinions have existed among foundrymen regarding this method. It had been considered by many that it involved the use of chills, thereby producing a hard, brittle thread which would be liable to break in making up. This, however, has not been the case. The method pursued has been the use of seamless sand cores formed without the fin or rib that is usually caused by the sections of a core box and which requires dressing off. The threads of these seamless cores are formed in the sand by the use of special devices. The dies of the thread forming devices are made of high grade steel and are subjected to a minimum amount of wear. When once made to standard gauge they will produce duplicate thousands of these seamless thread cores without variation, and perfectly round.

The seamless thread cores are then joined with the ordinary plain or body cores by the use of arbors, and are placed in the mold the same as ordinary cores. The special mixture and the fineness of the sand from which these thread cores are made, produce a clean sharp thread in the casting. The methods employed in uniting the thread cores with the plain cores are such, under improvements recently put into operation, as to render it impossible for the threads in the castings, where they come at opposite ends of the fitting, to be out of alignment.

It has been claimed that the contraction of the metal from the time it is poured into the mold until the cooling of the casting would produce sufficient shrinkage to render the making of cast threads unreliable and variable. Such a condition, however, does not exist in practice, and is perhaps due to the fact that the solid core prevents a shrinkage which might otherwise occur. The metal in the threads of castings thus made is of the same structure as that in the body of the casting, only having on the surface of the thread a thin film, present on all gray iron castings. This film proves to be of great benefit in practice, as it is harder than metal where the film is cut away, as is the case with standard threads cut on pipe. This cast thread being standard, true to gauge, and possessing the hard film of the casting, forces the cut thread of the pipe into a perfect union.

Regarding the iron used, ordinary foundry practice is pursued. The execise of care in the mixture of the iron and the use of analysis produce clean, sharp threads.

* A paper read at the annual convention of the American Foundrymen's Association, Philadelphia, Pa., May 21-23, 1907.

The Long Island Terminus of the Pennsylvania Tunnels.—Contracts for the only section of the Pennsylvania Railroad tunnels not already begun have been let. They are for building the eastern portals and approaches—where the trains will come out of the ground in Long Island City—and a short stretch of cut-and-cover tunnel just west of the portals. The job for which contracts are let extends to the end of "Sunnyside Yard," the largest electric car yard in the world. The excavation necessary to the construction of this yard will be as great as that required for the terminal station in Manhattan. Under the East River itself considerably more than 40 per cent. of the four iron lined tunnels has been completed. Eight shields are being pushed forward, four from each side of the river. Under Long Island City there is a stretch of 2000 ft. of the four tubes, and in this stretch the excavation is practically finished, and about 85 per cent. of the iron lining is in place. Concreting is now under way and is going ahead rapidly.

Shipbuilding in Germany.—Some interesting details of the progress made in the shipbuilding trade of Germany in recent years are given by the *National Zeitung*. Germany, it appears, has now secured second place in the world's shipbuilding, and comes next to Great Britain, but although it has attained this position, Germany's output for 1906 was only one-fifth of that of Great Britain, the latter country accounting for 1,826,300 tons out of a total of 2,919,700 tons built, as against Germany's 342,000 tons. The shipbuilding trade of Germany, however, is developing rapidly, for last year's total compared with only 200,000 tons in 1902, while at the present time there are building in that country steamers of an aggregate tonnage of 369,500.

The J. I. Case Threshing Machine Company, Racine, Wis., has filed a certificate of increase of stock from $2,000,000 to $5,000,000, and has made a mortgage to the First Trust & Savings Bank of Chicago as trustee to secure $3,500,000 first mortgage 5 per cent. bonds. It is stated that the average annual net earnings for the fiscal year ending December 31, 1906, were $887,900. Since 1880, when the present company was incorporated, $3,100,000 has been paid in cash into the capital and surplus account, all other additions to capital and surplus having come from the profits of the business. Since 1880 the dividends paid have amounted to $7,750,000, while over $4,000,000 has been added to capital and surplus. The net earnings grew from $238,000 in 1897 to over $1,100,000 in 1906. Notes and bills receivable taken by the company for the sale of its products were liquidated in the eight years ending December 31, 1906, to the amount of $20,572,831, and the cash realized on account of the principal alone was $19,841,806. The bond issue of $3,500,000 is for the purpose of funding a floating debt. The company's products include farm engines, both portable and traction, and threshing machines.

Two New Reed Engine Lathes.

An example of the standard type of motor drive adopted by the F. E. Reed Company, Worcester, Mass., is illustrated in Fig. 1, this being a new motor driven 14-in. lathe. Another improved type of engine lathe recently brought out by the company is a 24-in. belt driven lathe shown in Fig. 2, in which is embodied a geared feed with feed box, giving eight changes. The latter is a

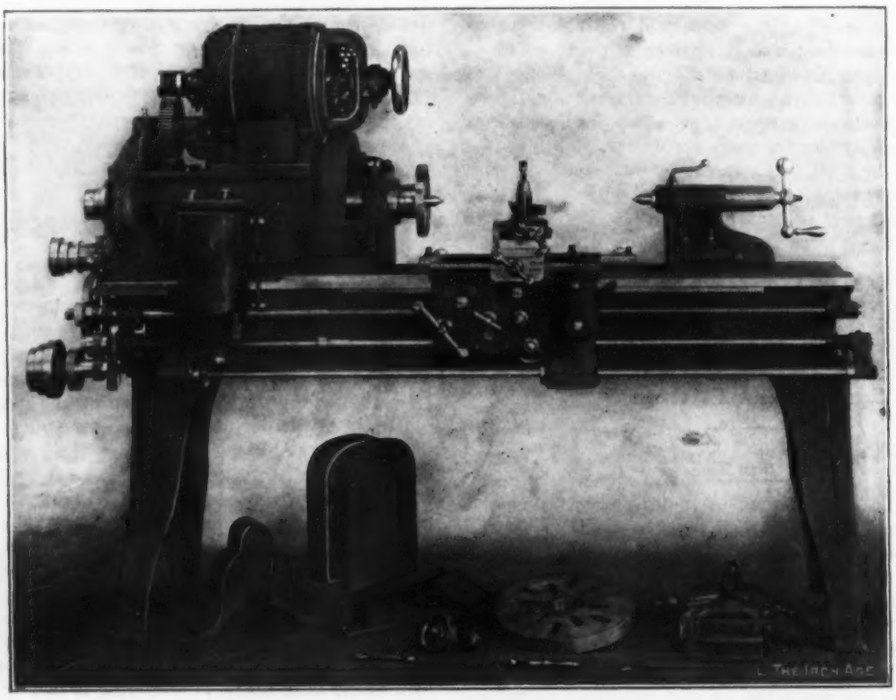


Fig. 1.—A Motor Driven 14-In. Lathe Built by the F. E. Reed Company, Worcester, Mass.

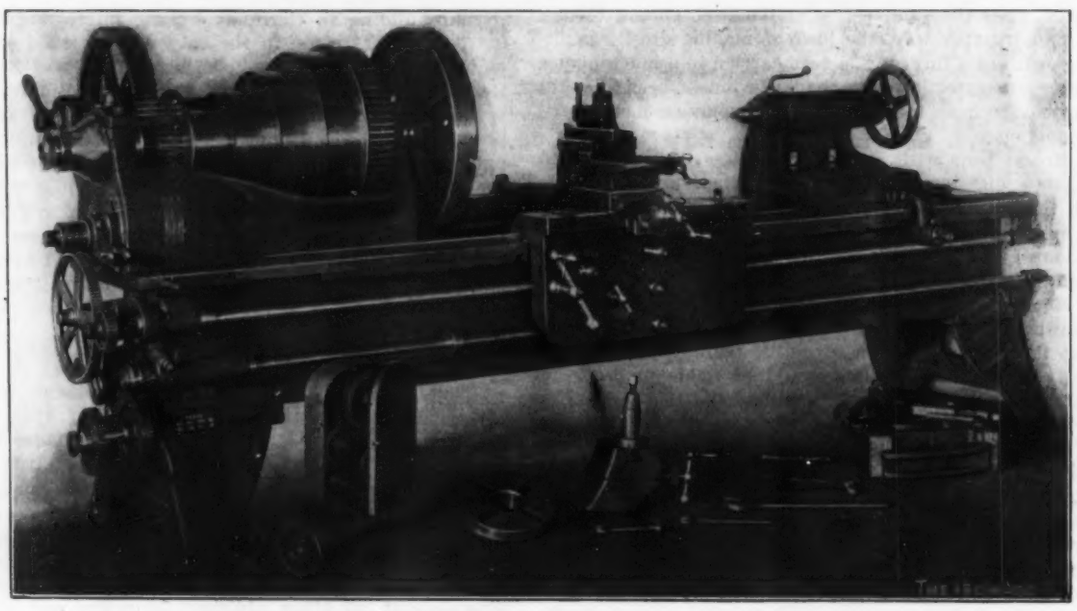


Fig. 2.—A 24-In. Reed Engine Lathe of Improved Type with Geared Feed.

powerful machine and has a four-step cone, the largest diameter of which is 19 in., for a 4½-in. belt. The ratio of back gearing is 11 to 1. All gears have an extra wide face. The lathe is also furnished with a five-step cone for a 3½-in. belt. The geared feed arrangement has been adopted for all Reed lathes, 16 in. size and upwards, of both belt and motor driver types.

One of the distinctive features of all Reed lathes has been the reversing gears in the head, driving a feed stud operating the lead screw and the feed rod. In the recently adopted gear feed the feed stud carries an additional gear, *a*, Fig. 3 inside the head, and transmits motion to the rod, as shown in this sectional view of the head, bed and legs. The gear *a* through two gears *b* and *c* on an arm depending from a bridge in the head, drives a gear, *d*, which in turn drives gear *e*. The latter is provided with a clutch face for engaging with a sliding gear, *f*. When so engaged it drives gear *g*, rotating a slidable shaft carrying a bank of four gears, *k*, any one of which can drive the clutch gear on the rod, through the intermediate gear *l*, thus providing for four feeds. Gear *m* on the same shaft as gear *d* drives gear *n*, which is also provided with a clutch face for engaging with the sliding gear *f*; and when so engaged the gear *g* drives the slidable shaft and bank of gears at another speed, providing another set of four feeds. Any gear in the bank can be quickly located in line with the rod clutch gear, and by means of a spring pin they can be brought into proper mesh with each other. The range of feeds for the 24-in. lathe illustrated are: 8, 11, 15, 20,

32, 44, 60 and 80. The lead screw for thread cutting is driven in the usual way by the use of interchangeable gears, as clearly indicated in Fig. 2.

The motor driven 14-in. engine lathe is equipped with belt feed, being the largest size not furnished with gear feed. The spindle drive is from a rawhide pinion on the motor shaft, through an intermediate gear to a gear mounted on a quill, which runs loose on the spindle. The quill drives the head spindle by means of a lock pin, as in the ordinary cone driven lathe. The machine is equipped with double back gears, this giving three series of spindle speeds. With a ¾-hp. variable speed motor 10 speeds are obtained direct from the motor through the quill, ranging from 490 to 164 rev. per min.; 10 speeds through the first set of back gears, ranging from 144 to 48 rev. per min.; and a third series of 10 speeds through the second set of back gears, from 48 to 16 rev. per min. The motor controller is operated by a handle at the front of the apron, at the right hand, actuating a splined rod which through bevel gears operates the controller.

The speeds are predetermined by means of a patent device on top of the controller. This consists of a disk, shown in Fig. 4, having 10 holes, each representing a forward speed of the spindle, five holes representing reverse speeds; and a hole for the neutral or idle position. Two plugs are employed in connection with this disk. On the side of the head of the lathe is a stop, O. The pins are placed in the holes designating the required function of the controller. In ordinary work one pin would be at the neutral position, the other at the desired speed. The operator throws the controller handle over to start the machine and the plug comes against the stop on the head, thus insuring the speed at which the controller

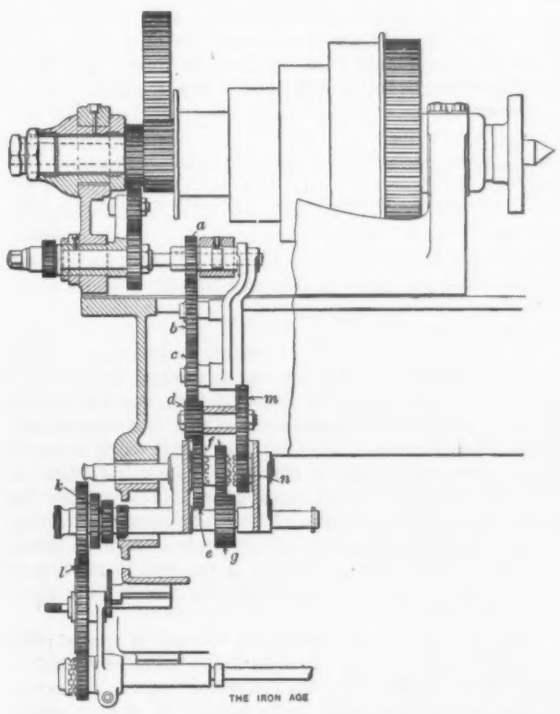


Fig. 3.—Section of the Head, Bed and Legs, with a Development of the Feed Gearing.

is set. To stop the machine the controller handle is turned until the pin at the neutral position encounters the stop. In thread cutting, if the operator wishes to reverse, one plug is set at the forward speed, and the other at the reverse speed desired. While cutting the forward plug is against the stop. Thus the lathe can be set for an unskilled workman, without danger of his causing loss by error of judgment. The device is especially valuable where duplicate work is to be done. The advantage of the pin arrangement is that it obviates the necessity of the operator removing his eyes from the work to set his controller at the notch to give the desired speed. The lathe is also equipped with a thread catching device, to do away with need of reversing the lathe. In all other particulars the machine has the standard Reed equipment.

The lathe is interesting as embodying the results of the co-operation of the F. E. Reed Company and the General Electric Company in the development of a variable speed electric motor for the drive of the machine. It is known as the new C. R. type. The controller, the R-75 type, is also new. This type of motor, with its resistance box and controller, make up an electric unit admirably adapted to lathe work, as demonstrated by

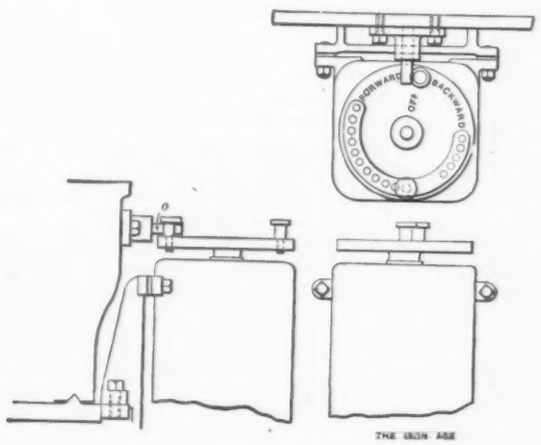


Fig. 4.—Details of the Controller Stop Device.

the results which have been obtained. An overload of 25 per cent. is allowable, and 50 per cent. on the intermittent work such as is usually done on a lathe. The motor can be reversed without sparking, and the machine can be run backward and forward, as with a belt-driven lathe, though if the lathe is running at a high speed, with a heavy plate or chuck on the head spindle, it would be unwise to reverse instantly, which would also be true of a belt-driven lathe. The speed control is accomplished by varying the resistance of the field circuit, consequently the motor is practically a shunt wound constant speed motor at any one speed at which it can be run, which means the highest efficiency possible in a variable speed motor. As high an efficiency is obtained at the lowest as at the highest speed, the horsepower remaining constant throughout the entire range if the motor is run at its full load.

In the application of the motor to the Reed lathe there are no belts, chains or rocking gears, and the direct drive has ample bearing surfaces, with no weak parts.

To prevent the spontaneous ignition of large masses of coal, the most important precaution is to avoid, as far as possible, breakage during storing; for the exposure of fresh surfaces of coal just at the time when it is being put under conditions in which the heat generated by the action of the oxygen in the air cannot escape, is one of the chief factors leading to this danger. The breaking up of the coal which has taken place at an earlier stage in its history has probably had time to complete this action, so far as the surfaces thus exposed are concerned, and the heat due to contact with the air has been gradually dissipated. In the store itself the greatest care must be exercised that no flue, drain or steam pipe that can give rise to an increase in temperature be near.

A novel appliance has been installed in the fire equipment of Nuremburg, Germany, in the shape of a three wheeled motor steamer, the steam being used both for propulsion and for pumping purposes, and the gear for propelling being placed on the front wheel. The idea of the design is said to be both for new engines and for the conversion of old engines. Liquid carbonic acid and benzine are both used for getting under way and for getting up steam rapidly. It is said that the device has proved very efficient.

The Foundry as a Business Venture.

At the convention of the American Foundrymen's Association at Philadelphia this week three papers were presented at the first day's session dealing with the business side of the foundry proposition. Each was by a different member, the first being on "The Gray Iron Foundry as a Business Investment," while the second and third dealt from a similar standpoint with the steel foundry and the malleable foundry. We present liberal synopses of the three papers below:

The Gray Iron Foundry.

BY THOMAS WEST, SHARPSVILLE, PA.

The principal points to be considered by one embarking in the gray iron foundry business are the following:

1. The great lack of skilled labor.
2. Influences retarding the training of a plentiful supply of skilled mechanics.
3. Insubordination of many of the skilled men available.
4. Difficulties and losses from working with the riff-raff a new foundry is compelled to employ at the start.
5. The slow attainment of discipline and organization.
6. Losses from defects developed in trying out new machinery and tools.
7. The advantage taken of beginners by sellers of appliances and buyers of castings.
8. Losses from accidents due to inexperienced operators of machinery.
9. The difficulty of obtaining good superintendents and foremen.
10. Losses and embarrassment caused by the narrow range of vision of hired managers.
11. Inability of proprietors, inexperienced in actual molding, mixing and melting, to avoid mistakes in picking managers and foremen.
12. Underestimating the obstacles and uncertainties every beginner must encounter.

The difficulties enumerated above are encountered much more in brisk than in dull times, and may be the means of driving the most experienced workers and financial managers to the wall.

The difficulty of obtaining good overseers as well as skilled labor, demands more consideration than does working capital, and often knocks out experience, good management and hard work. In one instance that recently came to the writer's notice a bookkeeper who never lifted a rammer put all his money into a small foundry and hired a farm hand to run it for him while he maintained his salaried position. When his working capital was exhausted he did not close his shop until he had involved others in his downfall. One thing is difficult to comprehend and that is the great difficulty of making men inexperienced in the business realize its hazard as well as the fact that skill is required to make good castings.

SOME SUGGESTIONS.

The course one should pursue, who has decided to start a foundry is indicated in the following:

1. He should thoroughly investigate the demand for the class of castings he intends to make and what competition exists.
2. Select a site central to his market and build on as small a scale as practical, planning for extensions that can be carried out without tearing down too much of the existing plant.
3. In the search for machinery and appliances he should get the experience of others. The A. F. A. convention should be visited and its exhibits inspected for the latest improvements.
4. Avoid as far as possible the purchase of second-hand tools. The new has all its life, whereas the old is more or less worn out, and will not as a rule give good service for the money expended.
5. One not competent to quote prices should not be ashamed to seek his manager's or foreman's advice.
6. Don't be in a hurry to fill your shop with work. Go slow, feel your way, and your chances for error or failure will be greatly decreased.
7. Be sure to have sufficient working capital and good chances of obtaining more than is considered necessary.

No man who intends to be at the head of a foundry can be too thorough in the actual work of molding, mixing and melting, and he should have executive and business qualifications. There is no business demanding skill and experience wherein so many enter who are wholly deficient in practical knowledge of its operations. Thirty years ago scarcely any thought of going into the foundry business if they were not so practical that they could discharge any molder and take hold of his work in a more masterly manner. To-day we find bankers, lawyers and even clerical men who assume to manage foundries.

The Steel Foundry.

BY W. M. CARR, NEW YORK.

Investors in steel foundries to-day do not have to meet the difficulties that beset early ventures in that line. In considering the size of the investment it is found that small plants can show as great a percentage of profit as larger ones. A plant yielding 150 tons daily, or 4000 tons monthly, would employ about 1800 hands, and would require a large amount of ground with good shipping and receiving facilities. There should be at least five 25-ton open hearth furnaces with four of them in regular operation. The furnaces would have to be served with electric charging machines, the molding and casting floors served by several 35-ton cranes. Hoists and light travelers would be required in cleaning, finishing and shipping departments. It should have a well equipped power house with engines and generators, pattern shop, machine shop, yard locomotives and liberal molding machine installations. Such a plant would call for about $1,000,000 capital and buildings and equipment would cost $750,000. The following estimate of cost per ton of capacity will hold for large plants ranging from 80 tons a day from two 25-ton furnaces to 150 tons a day from five 25-ton furnaces:

Furnaces	$1,200
Gas producers, gas mains or oil tanks and accessories	600
Buildings, 800 sq. ft. per ton at $1.25	1,000
Power, machinery, cranes, hoists, ladles, drying ovens, &c.	2,300
Total cost per ton	$5,100

Such an equipment with a good demand for casting can show 25 per cent. on the investment.

THE OPEN HEARTH FURNACE.

In general practice it is better to have two open-hearth furnaces if a modest plant is desired, keeping one in reserve. The larger furnaces, 25 tons, are best suited for heavy castings although some plants run successfully on pieces averaging 30 lb. each. If small work is made, pieces averaging 10 lb., a small open hearth furnace is suitable. For very light castings weighing ounces the Tropenas process is in use. The pronounced limitations are the heavy losses and the high price of new material. It is admitted by the inventor that the loss in melting is 17 per cent., while in open hearth practice it only averages 7 per cent.

The pig iron for the Tropenas process is special; for the basic process cheap pig iron and almost any kind of scrap can be used. For the converter process there are but few skilled operators to be found. It is well suited for special purposes, but for general uses it does not compete with the open hearth. As between basic and acid furnaces, the former is cheaper and the stock for it more plentiful. Physically basic steel in castings is just as reliable as acid steel.

A SMALL STEEL FOUNDRY OUTFIT.

To the gray iron founder feeling the inroad of steel castings, a basic open hearth furnace of 5 tons capacity is suggested. Any pig iron with silicon below 1.25 per cent., sulphur not over 0.08 per cent, and phosphorus with 1.00 per cent or less can be used and such analyses would cover some grades of cast iron scrap in the shape of old car wheels, malleable, &c. Charged with 50 per cent. of steel scrap such as springs, rails, agricultural scrap, defective steel castings, &c., this would give steel castings of good quality from low grade stock. No heavy

machinery would be needed to handle heats. The only change would be in providing special molding sand. The basic furnace could be used to put to profit machine shop turnings and borings by mixing them in moderate quantities with the charges. In some cases it might be advisable to line the furnace for acid melting and if desired it could be used for turning out "air-furnace-iron" heats.

A 5-ton furnace, basic lined, erected in an active iron foundry, would cost about $6000, and allowing $4000 for special bottom, pouring ladles, oil storage tanks, burners, etc., the total would be $10,000 exclusive of buildings. It would be capable of producing three heats daily and would yield 12¾ tons of castings at the rate of 15 per cent. in melting loss, gates, heads, skulls and defective castings, an average yield in a well ordered plant. Producing such tonnage steadily should show good profits. The single furnace, however, has the disadvantage of going out of commission for repairs. It should turn out 400 heats before a general overhauling, or say a run of 133 working days. Assuming that the furnace was only productive nine months of a year at 25 working days per month, there would be 225 days yielding a total output of 2868¾ tons. Allowing an average profit of ½ cent per pound, there would be a gross profit of $28,687.50 annually. But making allowance for losses, strikes, breakdowns, etc., and figuring only 7½ tons a day and a gross profit of ⅛ cent a pound, the returns would be $4,218,75. Deducting 25 per cent. for interest, depreciation, etc., and the net profit is still $3,164.07, or 31.6 per cent. on $10,000. In lean times the small plant can bear the brunt as well as the large one, since small capital is involved.

The Malleable Foundry.

BY DR. RICHARD MOLDENKE, WATCHUNG, N. J.

Hardly a week passes but that I receive inquiries regarding the cost of establishing malleable castings plants. The answer I have to write invariably is: "Unless you have at least 5 tons daily to make—don't."

As a rule the requests for information come from those iron foundries which get orders for plenty of gray iron castings with a sprinkling of malleable, and possibly some steel castings also. The high price they have to pay outside for small lots naturally interferes with their legitimate profit, and hence the desire to produce for themselves. I believe that when the electric furnace is perfected, or made commercially possible, a different aspect will be given to the case, but at present we have to take things as they are.

Those concerns which use a large quantity of these castings are the natural pioneers for a given region. The fact that they can make money where they are would be a pretty good guarantee that they can either save money or get their desired deliveries by going into the malleable casting business. Moreover, their profit as manufacturers will carry them over the two or more years of loss in starting the malleable plant.

FAVORABLE FACTORS.

To sum up briefly the advantages, I give the following:

1. The expanding market for malleable castings, and the great room for improvement in most of the producing works, gives a living chance to the man to go in the business provided he understands it thoroughly.

2. In times of prosperity plants in existence, where great caution is exercised, must turn away large quantities of offered work, being unable to produce it.

3. The moment the malleable castings works are full deliveries are so desperately bad and slow that attention is turned directly to new enterprises coming in.

4. The adaptability of the malleable casting to specialties in railroad, agricultural and hardware lines is such that the beginner has a good chance to succeed provided his specialty is good.

5. Where absolutely good material is required it pays the consumer of malleable castings to go into making these himself, provided he has enough tonnage. Only he who knows how easily one can slip up on the quality of the malleable casting also knows how often this is done, and the customer is not the wiser.

6. The malleable product from its adaptability to specialties, and comparatively light castings at that, means a production in quantity of each separate piece. Hence it is not a question of half a dozen castings, but oftentimes several hundred thousand, or, in other words, continuous production, with comparatively well regulated and systematized shop cost.

THE DRAWBACKS.

Now the disadvantages follow from the above:

1. The expanding market, while making room, also leaves very empty shops in dull times, for the existing plants usually expand with each high wave of prosperity and manage to hold the desirable customers.

2. Where the work turned away by the full plants is taken by the beginner it is at lower prices, or if at high prices is lost again when these fall. Ability to hold customers who may have been exasperated elsewhere, or ability to produce cheap enough to cut under, or most likely having a specialty which pays the freight, will make or break the new malleable plant.

3. The capital required is a great detriment, being about four times as much as for the same tonnage in gray iron for works alone. The malleable casting process is intricate, the chances of loss great, and it takes fully two years to get a desirable class of men in the shop. Hence the chances of no profit, if not worse, for a long time. A rough calculation of the cost of a shop to produce 50 tons of castings daily would come up to, say, $250,000. By the time that shop would be actually producing the 50 tons daily at a normal shop cost, over double the amount of money will have been expended. Then, however, with a good market the shop will pay handsomely.

4. The high grade of skill required. With the range of composition for the iron for various thicknesses of the castings very close, a white iron to start with, with its double contraction, and danger of shrinkage in the interior, with the necessity of chills, the limit to the size and weight, the expansion in the anneal, &c., it is a pretty delicate task to turn out large quantities of various classes of castings and have them all high grade. Hence the high salaries the important men must be paid and the eternal vigilance required in the works. It must be remembered that your day's work goes into the anneal and you do not see it for a week. The next day's work the same, and hence a mistake in the temperature of the ovens, and you have ruin for possibly a week before you find it out. I remember the slipping off of the night annealer to a nearby speak-easy, with the increase in the natural gas pressure just at that time, which meant thousands of dollars of damage for two or three hours' inattention.

5. The fierce competition that is met. This is primarily the case, because to run a shop successfully and to hold an expensive organization everybody must be busy. The first aim, therefore, is tonnage, to keep the shop producing at maximum capacity all the time, practically regardless of prices sometimes. Hard times drop prices in the malleable shop far more quickly than in the gray iron establishment. I remember the time when castings were sold to the railroads at a shade less than 2 cents a pound, delivered. When it is remembered that malleable castings ought to bring a cent a pound more than the corresponding gray ironwork it will be seen what a new man is up against in starting when prosperity is on the wane.

The further reason for this fierce competition is that nearly everybody in this line has a specialty, or several of them, which sell under patents and for as high a price as the community will stand. Hence this velvet can cover a deficit to keep the rest of the works in operation. This, of course, is hard on the man who has no specialty, and hence, again, the necessity of having abundant capital until such a specialty is found.

To sum up. With a good specialty, or a number of castings used in the manufacture of well paid for articles, and a sufficient daily tonnage, it is good policy to go into the malleable casting industry as a business venture; but with less than 5 tons daily safe, and with insufficient working capital, and men not thoroughly trained in this line, it is better to let it alone.

Scientific Discovery.*

BY R. A. HADFIELD, SHEFFIELD, ENG.

In a lecture I gave some time ago I pointed out some of the chief means by which we can hope to solve metallurgical problems. Let us take literature alone. Research into the past prevents our working on ground already described and known, or from seeing the mistakes of others we ourselves avoid making the same mistakes, or we get instilled with new ideas which show the way to new branches of research.

From the study of alloys and their special properties we learn very much. Theoretical chemistry and chemical laboratory work, metallography, heat treating, including the application of pyrometers and the study of recalescence phenomena and other changes, represent a vast store of information and research. Electrical tests, mechanical, physical and other tests, all add their quota of information. We shall say, after reviewing this formidable list of subjects, that the study of metallurgy is not a real and important part of scientific investigation?

The Art of Scientific Discovery.

When speaking of metallurgical literature, there is one precious work above most others to which I would like to direct your attention. It is one to which I have several times referred and quoted in my papers and addresses. I refer to Dr. Gore's book "On the Art of Scientific Discovery." Dr. Gore is an Englishman who himself did important research work. For example, he discovered that iron while it is cooling from red heat and under longitudinal strain undergoes sudden molecular and magnetic change, attended by increase of length at a particular time. From this eventually sprang the wonderful discovery of my friend Barrett, namely, that of recalescence.

Gore shows that scientific discovery is really no matter of accident and that the art can be cultivated, so there is indeed hope for most of us. While all may not have the same mental capacity, many of us by scientific study, at present often conducted in a too haphazard manner, may acquire the art to a greater or less degree, as is well evidenced by your own Patent Office, humble though some of the discoveries may be. There is of course some difference between discovery and invention. Gore defines it to be as follows: "Discovery consists in finding new truths of nature, while inventions consist in applying these truths to some desired purpose." However, for our purpose, we may treat them more or less on a par.

Of course, as Gore himself points out, he does not maintain that important discoveries can be completely made by rule alone, but that it is now much more possible, and that the process of scientific discovery can be more completely reduced to order and rule than is usually supposed.

To such an audience as the present, it may be interesting to say that I find the following methods of discovery are analyzed and tabulated by Gore. While these may not represent all, they no doubt cover most of those known to human ken. This remarkable list shows how extensive is the field for scientific research. Now why do I refer to this aspect of the case? Because it shows you that without doubt the art of scientific investigation can be systematically arranged to a much greater degree than has been commonly supposed to be possible:

Discovery.

Aided by analogy.
By hypotheses.
Is a condition of invention.
By analysis and synthesis.
By applying electricity to bodies.
By applying heat to substances.
By asking questions and testing them.
By assuming the certainty of all the great principles of science.
By assuming the existence of complete homologous series.
By assuming existence of converse principles of action.
By assuming that certain statements which are true of one force or substance are true to some extent of others.
By the combined action of many observers.
By comparing facts and collecting similar ones.
By comparing collections of facts with each other.
By comparing the orders of collections of facts.
By comparison of facts with hypotheses.
By deducting process.
By employing new or improved means of observation.
By examining the ashes of rare plants and animals.
By examining common but neglected substances.
By examining the effects of contact of substances.
By examining the effects of forces on substances.
By examining the effects of extreme degrees of force.
By examining extreme or conspicuous instances.
By examining influence of time upon phenomena.
By examining neglected truths and hypothesis.
By examining peculiar minerals.
By examining unexpected truths.
By examining rare substances.
By examining residual phenomena.
By examining residues of manufacturers.
By extending the researches of others.
By extending the researches of neglected parts of science.
By inductive process.
By investigation of exceptional cases.
By investigating unexplained phenomena.
By investigating classification unexplained.
By means of converse experiments.
By means of instruments of great power.
By means of improved methods of intellectual operation.
By means of measurements.
By means of the method of curves.
By means of the method of least squares.
By means of the method of means.
By means of the method of residues.
By means of new instruments.
By means of modes of observation.
By means of observations.
By means of more intelligent and acute observations.
By means of additional observations by known methods.
By means of periodic functions.
By means of more refined methods of working.
By means of repetition of experiments.
By simple comparison of facts or phenomena.
By searching for impossible things.
By searching for one thing and finding another.
By synthesis.
By subjecting series of forces or substances to new conditions.
By using known instruments or forces in a new way.
By the use of improved instruments.
By the use of more powerful instruments.
Of causes by the method of averages.
Of coincidences.
Conditions of scientific discovery.
Conditions which determine scientific discovery.
Conditions which determine the nature of a discovery.
Contrasted with barren reasoning.
Dependence of discovery upon art.
Of exceptional instances.
Fundamental laws of discovery.

Deductive Capacity Leads to Discoveries.

The word "discovery" naturally suggests to an English person who visits you, "What led Columbus to discover America?" His deductive capacity must have been very great, and no doubt mentally he must have gone through more than one of those phases described in the list I have just quoted. His was no happy go lucky expedition, but made with a definite purpose, founded on certain definite facts beforehand. It is interesting to remind you that while on his voyage of discovery and founding another continent he discovered the variation of the compass.

I would here refer to the recent important report of the Committee on the Uniform Nomenclatures of Iron and Steel, of which Dr. H. M. Howe is chairman. The committee, in its attempts to find definitions for the nomenclature of iron and steel, is doing most excellent work, and I congratulate its chairman and hope that we shall have before long a world wide nomenclature so far as this is practicable, which will bring about the unification of different terms so frequently used in metallurgical literature.

In conclusion, may I again express my admiration of the great work this country is accomplishing, whether as regards its social, political or technical life? Although it is not for me to intervene in political matters, I cannot help saying how important to the world at large to-day is what America says and thinks. Your new interest in "welt-politik" means very much. Imbued as you rightly are with the spirit of political freedom, so your influence on the world's history is of the highest importance. Do not shrink from exercising this great influence and power, both of which are much greater than many here seem to think. You have set us older peoples examples that we must in many ways adopt, and greatly to our benefit.

* From an address to the members of the School of Applied Science of Columbia University, New York, May 8, 1907.

The Proper Installation and Use of Compressed Air.*

BY W. P. PRESSINGER, NEW YORK.

In the early days of air utilization, much was heard about the rivalry between pneumatic power and electricity for transmitting energy from its source of inception to its point of consumption, and each had its votaries and advocates more or less extreme in their partisanship. To-day, each has found its recognized and legitimate sphere of usefulness, and frequently both forms of power are made to co-operate in the achievement of the best results. Electricity is the desirable long distance transmitting agent, and as such is employed to a wide extent to convert distant water powers into compressed air at the operating point for driving drills, hoists, pumps, &c. Similarly in industrial plants of large area, motor driven compressors may be found distributed at points of chief consumption, the transmission of the electrical current being preferable to the initial cost, inspection and maintenance of long distance air mains. Many main power plants have large compressors motor driven when conditions favor this form of drive. Therefore, in its own unique field, by reason of properties peculiarly its own, compressed air remains in undisputed possession.

Improvement in Compressor Equipment.

It is natural to expect that larger compressing units would produce compressed air with less relative expenditure of power, since the opportunity exists for refinements of design and construction not possible in the smaller compressors. But so great has been the demand for a reduction in the cost of compressed air production that contemporary compressors in all sizes are vastly superior to the earlier patterns in use when air tools were first introduced. This has been accomplished through an intelligent appreciation by the builders of air compressing machinery of the more arduous service which compressors undergo, to which they have responded by designing machines adequate in weight, strength, bearing surfaces, valve areas, and automatic regulation, for the severer conditions. Users of compressed air in the selection of their compressors have contributed an influence equally beneficial by exercising a discriminating knowledge and judgment (expensively obtained at the school of experience) which they did not possess when compressors first supplanted air brake pumps.

An evil to which not overscrupulous compressor builders have contributed is the overrating of compressor capacities. As is well known, compressors are rated according to their piston displacement, being the cylinder area multiplied by the piston speed. From this result deductions due to clearance losses and heat expansion must be made to arrive at the actual volume of air delivered. These losses necessarily vary according to the quality of the machine, emphasizing the inevitable conclusion that greater initial investment pays a handsome dividend. Beyond an arbitrary limit, however, compressor ratings at high speeds mean nothing but deception, since greater displacement than the air valve area permits is not possible, even if structural strength and bearing surfaces are adequate, which they rarely are. Experienced compressor users realize thoroughly the desirability of providing machines of size sufficient to deliver the requisite yield at moderate working speed, reducing cost of maintenance and greatly prolonging the life of the machine.

The Kind of Compressors to Be Used.

But while these recent prosperous times have enabled a great betterment of compressor equipment, there is much yet to be accomplished. There still remain air brake pumps in use supplying shop requirements, and plants with compressors inadequate or obsolete, or both, are still altogether too numerous. An investigation applied to individual conditions would develop results so surprising as to overcome all ordinary objections to the increased investment, and instances where compressors have been shown to earn their cost within one or two years after installation are by no means rare.

For railroad shops and industrial establishments the steam driven compressor is, of course, most generally employed, though many more motor driven compressors are used than formerly, conditions being favorable.

The demand is steadily growing for compressors of moderate capacity for use where steam to drive them is not available. Motor driven compressors meet this requirement if electrical current is obtainable and gasoline engine driven compressors where neither steam or electricity may be had. Such machines are highly useful for maintenance of way and bridge construction and repair at junction points. The necessity of testing the air brake equipment of cars received from other lines has also created a considerable demand for self-contained gasoline driven compressors with engine and compressor mounted upon one bed, the engine driving the compressor by gear or silent chain.

Compressors up to 200 cu. ft. per minute capacity for a terminal air pressure of 100 lb. per square inch are usually of the single cylinder type, double acting in that they compress air with each stroke, displacing the cylinder contents twice per revolution. Above 200 cu. ft. per minute two-stage compressors show an economy that should not be disregarded. Formerly duplex compressors having two simple compressing cylinders were common, but, except for low air pressures that do not warrant compounding, these have been superseded by the two-stage type.

The steam cylinders have balanced slide valves, with independent adjustable cut-off usually provided for cylinders of 12 in. in diameter or larger. Steam cylinders are compounded generally when the steam pressure at throttle is sufficient to warrant. The limit of capacity at which the Corliss steam end should supplant the slide valve varies according to the appropriation available and the cost of fuel. However, Corliss compressors of 1500 and 2000 cu. ft. per minute capacity are much more frequently installed than formerly.

Installation and Operation.

After determining the important element of compressor selection much can be accomplished in the direction of intelligent installation. Proper compressor location, a well planned air pipe system of adequate proportions, appropriate size and location of air receivers, provision for moisture drainage, systematic inspection to locate and stop air leakage, air hose of good quality, tight, quick acting couplings, are all features that contribute to a properly planned and executed compressed air plant.

Effectual measures should be adopted to prevent the useless waste of compressed air, so frequently encountered in shops. Since the atmosphere that we breathe is free, its value when compressed, represented by the cost of maintenance of plant and power expended in compressing it, is too lightly regarded, with the result that it becomes a favorite means of blowing dust from machines, work benches and garments, and a plaything in the hands of the mischievous, frequently with dangerous and sometimes with fatal results. For cleaning armatures and delicate machinery compressed air is often an indispensable agent, but strict orders and severe penalties should prevent its indiscriminate and unauthorized waste.

Trouble from the presence of moisture in compressed air is now infrequent, and is readily overcome by effectual cooling after compression, similar to the treatment provided for switch and signal installations.

Dirt and grit in compressed air clog the necessarily delicate working parts of the pneumatic tools, and the inevitable excessive wear on valves and other parts causes rapid depreciation in value and power. To avoid this it is desirable to screen or filter the air at the compressor intake, but care must be observed not to have the screen of too fine a mesh or the air supply will become partially throttled. Occasional instances have occurred where compressor capacity has been markedly curtailed from this cause. As most of the air tools now sold are also provided with individual strainers, trouble from dirt in the

* From a paper read before the Central Railway Club, Buffalo, May 10, 1907. Mr. Pressinger is general manager of the air compressor department of the Chicago Pneumatic Tool Company.

tools is not frequent. These strainers also must be kept clean or the tool will appear to have lost its power.

The lubrication of compressors and pneumatic tools is a feature deserving careful attention. A too frequent mistake is made by using in air cylinders of compressors oil intended for steam cylinders. Such oil is of low flash point, whereas the power lubrication of air cylinders demands a light oil of high flash point and of very best quality. Oil of poor grade and low flash point becomes vaporized in air cylinders and is discharged with the air without effecting lubrication.

New Freight Rates on Iron and Steel.

Effective June 1, 1907, freight rates on articles named below from Pittsburgh and points taking the same rates, to the points named will be as follows per ton:

	Pipe iron and steel	Ferromanganese, zinc skimmings,&c.	Wire rods.	Sheet and tin plate bars.	Chain iron.
Allentown, Pa.	$2.40	$2.40	$2.40	$2.40	...
Bethlehem, Pa.	...	2.40	...	...	...
Bridgeton, N. J.	3.40	...	...	...	...
Brooklyn (E. D.), N. Y.	...	...	2.60	2.60	...
Brills, N. J.	...	2.60	...	...	...
Chester, Pa.	2.40	2.40	...	...	...
Coatesville, Pa.	2.40	...	...	2.40	...
Conshohocken, Pa.	2.40	...	...	2.40	...
Carlisle, Pa.	...	...	...	...	2.30
East Conshohocken, Pa.	2.40	...	...	...	...
Elmira, N. Y.	...	2.20	...	...	...
East Newark, N. J.	...	...	2.60	...	...
Easton (North Co.), Pa.	...	...	2.60	2.60	...
Frankford, Pa.	...	...	...	...	2.40
Gettysburg, Jct., Pa.	...	...	...	...	2.30
Harrisburg, Pa.	2.20	...	...	2.20	...
Harrison (Hudson Co.), N. J.	...	...	2.60	...	...
High Bridge, N. J.	..	2.60	...	...	...
Jersey City, N. J.	...	2.60	2.60	2.60	...
Lebanon, Pa.	...	...	2.40	...	2.40
Linfield, Pa.	...	...	...	2.40	..
Middletown, Pa.	2.40	...	...	...	...
New Castle, Del.	2.40	...	...	...	...
Newark, N. J.	2.60	2.60	2.60	2.60	...
*New York, N. Y.	2.60	2.60	2.60	2.60	2.60
Norfolk, Va.	...	...	...	2.80	...
Norristown, Pa.	2.40	...	2.40	2.40	...
Oak Lane, Pa.	2.40	...	...	...	...
Paterson, N. J.	2.60	2.60	...	...	...
Philadelphia, Pa.	2.40	2.40	2.40	2.40	...
Reading, Pa.	2.40	2.40	...	...	...
Passaic, N. J.	...	2.60	...	...	...
Pottsville, Pa.	...	2.40	...	...	...
Pottstown, Pa.	...	2.40	...	...	...
Phillipsburg, N. J.	...	...	...	2.60	...
Phœnixville, Pa.	...	2.40	...	...	...
Richmond, Va.	...	...	...	2.80	...
South Chester, Pa.	2.40	...	...	...	...
Scranton, Pa.	...	2.40	...	...	...
South Bethlehem, Pa.	...	2.40	...	...	...
Steelton, Pa.	...	2.20	...	...	...
South Easton, Pa.	...	...	2.60	2.60	...
Trenton, N. J.	...	...	2.60	2.60	2.60
Wilkes-Barre, Pa.	...	...	2.40	2.40	...
Wilmington, Del.	...	2.40	...	2.40	...
Weehawken, N. J.	...	2.60	...	...	...

* The rates named above to New York are for export.

Effective on the same date, freight rates on finished iron and steel from Pittsburgh, and points taking the same rates to the points named below will be as follows, per 100 lb.:

	L. C. L. Cents.	C. L. Cents.
Albany, N. Y.	19	16
Baltimore, Md.	17½	14½
Binghamton, N. Y.	16	13½
Buffalo, N. Y.	13	11
Carbondale, Pa.	18	15
New York, N. Y.	19	16
Philadelphia, Pa.	18	15
Richmond, Va.	24	20
Rochester, N. Y.	13½	11½
Syracuse, N. Y.	16	13½
Utica, N. Y.	17½	14½
Williamsport, Pa.	16	13½
Meadville, Oil City, &c., Pa.	10	8

The new rate on pig iron from Chicago to New York will be $4.75, on billets and scrap iron $5, per gross ton, and on finished iron and steel 30 cents per 100 lb.

Freight Rates on Iron Ore.

Freight rates on iron ore in carloads, minimum weight 20 gross tons, from lower lake ports, which include Cleveland, Ashtabula, Conneaut, Toledo, Sandusky and Lorain, Ohio; Erie, Pa., and Huron, Mich., to points named below are now as follows, per gross ton:

	Cents.		Cents.
Akron, Ohio	74	Martins Ferry, Ohio	100
Alliquippa, Pa.	96	Monessen, Pa.	114
Beaver Falls, Pa.	96	Newburg, Ohio	42
Bessemer, Pa.	114	New Castle, Pa.	74
Brier Hill, Ohio	74	Neville, Pa.	114
Connellsville, Pa.	135	Niles, Ohio	74
Dunbar, Pa.	135	Pittsburgh, Pa.	114
Ellwood City, Pa.	96	Rankin, Pa.	114
Everson, Pa.	135	Scottdale, Pa.	135
Girard, Ohio	74	Sharon, Pa.	74
Glassport, Pa.	114	Sharpsville, Pa.	74
Greenville, Pa.	74	Shenango, Pa.	74
Hazelton, Ohio	74	Struthers, Ohio	74
Hubbard, Ohio	74	Warren, Ohio	74
Leetonia, Ohio	74	West Middlesex, Pa.	74
Lowellville, Ohio	74	Wheatland, Pa.	74
Lucas, Pa.	114	Wheeling, W. Va.	100
McKeesport, Pa.	114	Wylie (Clairton), Pa.	114
McKees Rocks, Pa.	114	Youngstown, Ohio	74

The rate from Buffalo to eastern Pennsylvania is $1.60, against the old rate of $1.50 per gross ton.

An Anglo-Japanese Steel Company

In *The Iron Age* of March 21, 1907, page 896, a description was given of the Imperial Japanese Government Steel Works at Wakamatsu, based on an official report published in the British Board of Trade *Journal*. London *Engineering* gives the substance of reports recently published at Tokio of an agreement concluded between two important English firms on the one hand and the Tanko Steamship & Coal Company on the other hand for the establishment of steel works at Muroran, in the Hokkaido or Northern Island, formerly called Yezo. The capital is to be 10,000,000 yen, taken in equal portions by the English companies and the Japanese. Ore, it is said, will be obtained from iron sands on the island or from other sources, failing that. It is further stated that assurances have been given of support by the Japanese Government, at least until the completion of the present naval programme.

In the same connection the statement is made that while the Government steel works at Wakamatsu in the south of Japan have turned out considerable steel, operations are still carried on at a loss, in spite of the fact that the Government has paid higher prices for the product than those at which imported steel could have been obtained.

Interest in the application of steam turbines to marine propulsion is renewed by the approaching advent of the two new Cunarders. The ships are to steam at the rate of 25 knots by the application of about 70,000 hp. to four shafts. The low pressure turbines weigh about 430 tons each, while the rotor has a net diameter of 15 ft. 9 in. and a diameter over blades of 19 ft. 3 in. Under normal operating conditions the peripheral speed will be 142 ft. per second (97 miles per hour). Steam will be supplied at a pressure of 200 lb. per square inch by a battery of 25 cylindrical boilers, with a total of 192 furnaces, and fitted with Howden's system of forced draft. These boilers have a total grate area of 4000 sq. ft. and a heating surface of 160,000 sq. ft., or nearly 4 acres. Each outboard shaft will contain two turbines, the low pressure for running ahead and the astern turbines. The inner shaft will contain the high pressure ahead turbines only.

The towns of Trajuato and Guanajuato, in Mexico, are being lighted by electricity brought from a distance of over 100 miles, at a voltage of 60,000. The prime movers are Pelton wheels, aggregating 5400 hp., and actuated by water falling through a head of 274 ft. on the River Duero. Four three-phase alternators are used, operating at 2300 volts, from which pressure the voltage is stepped up to the high transmission figure.

The Use of a Heated Foundry Mixer.*

BY J. B. NAU, NEW YORK.

In many places where foundries are located near blast furnaces direct metal from the furnaces has been used, eliminating all intermediate remelting processes, with their increased cost and defects in quality. The practice is naturally limited, at least in this country, to rough castings and cheap shapes, where the chemical composition and uniformity of metal are of less importance. In the finer grades of castings, where more exacting requirements are the rule, the use of direct metal from the blast furnace is excluded, and in many cases, as in cast iron pipes, the remelting of the metal in a cupola or an air furnace is prescribed by specifications.

Lack of Uniformity in Direct Metal.

One of the greatest objections to the use of direct metal is the fact that uniformity is not always possible to obtain, even in the most carefully managed blast furnace. Could uniformity be guaranteed at all times there is no reason why direct metal from the blast furnace should not find a more general application. It was mainly to overcome this difficulty that at the meeting of the American Foundrymen's Association, held in New York in June, 1905, the writer recommended the use of a heated mixer as an intermediary receptacle between the blast furnace and the foundry, into which iron from the blast furnace could be poured, kept liquid for any desired length of time, its quality corrected by suitable additions of either liquid or solid pig iron or even wrought iron scrap, and tapped in such quantities and at such times as would suit the needs of the foundry.

To-day I am in a position to state that the first step in this direction has been taken by one foundry, and that other foundries also contemplate the adoption of a mixer. Last year the writer received instructions from the general manager of a blast furnace plant to design a mixer for the new foundry his company is now building. The foundry, which will be a most modern one in every respect, will have a capacity in the beginning of only 25 to 30 tons of very small castings, but in the very near future its daily capacity is to be increased to fully 100 tons.

Features of the Mixer.

Owing to the limited output a high priced tilting mixer, with all its attendant operating and maintenance cost, was out of the question. It was, therefore, decided to build a stationary furnace of the Siemens type, with a short and deep hearth and air regenerators of a capacity considered sufficiently large for the temperature desired in the mixer. To avoid the operation of gas producers and the building of gas flues and valves, oil was adopted as fuel. The rated capacity of the mixer is only 25 tons, or sufficiently large to receive at one time all the iron that the foundry will require in a day's work in the beginning. On account of the very large number of small castings to be made the mixer will have to be tapped and stopped many times during the day.

If only a single tap hole were laid in the lowest part of the hearth the danger of metal breaking through between two taps would be great. In order to avoid this it was decided to adopt a certain number of tap holes laid at different levels, and to draw from the upper tap hole all the metal that can be taken there before opening any tap hole lower down.

Size of Mixer for a 100-Ton Foundry.

A mixer of 25 tons capacity is large enough to supply a foundry of 100 tons daily capacity and even more, the principal role of the mixer being to receive the direct metal from the furnace in large quantities during the day, keeping it hot there and correcting its quality, if necessary, by suitable additions, the metal being withdrawn in repeated smaller taps whenever required in the foundry. The iron is brought from the furnace to the mixer in a ladle hung from an overhead trolley, thereby avoiding any interference with the yard track.

In the large foundries where different grades of iron are used for different castings, the mixer again will be handy. In this case the direct iron from the blast furnace could be stored away in a primary mixer of larger capacity, from which it could be tapped to feed two or three secondary mixers of smaller capacities. Each of these could supply one department of the foundry, and with suitable additions of either pig or wrought iron scrap the grade of iron required in that special department could be obtained accurately and with ease.

The mixer now building will not be in operation for some time. We, therefore, can submit no working data.

* A paper read at the annual convention of the American Foundrymen's Association, Philadelphia, Pa., May 21-23, 1907.

The Providence Machinists' Strike.

The Rhode Island Metal Trades Association, at a meeting held May 17, voted unanimously to refuse to consider the demands made by the union upon various machine shops of the city and vicinity, on the ground that the demands constitute an unwarranted interference with the rights of both employers and employees, and are detrimental to the successful operation of the open shop, for which the association stands. The declaration of principles of the National Metal Trades Association, previously adopted by the Rhode Island Association, was indorsed by the representatives of the 24 concerns at the meeting, consisting of the American Locomotive Automobile Company, Brown & Sharpe Mfg. Company, Providence Engineering Works, D. & W. Fuse Company, Langelier Mfg. Company, Henry L. Scott & Co., Providence Mfg. & Tool Company, Beaman & Smith, Universal Winding Machine Company, C. A. Mann, Providence Machine Company, Rhode Island Machine Company, New England Butt Company, Franklin Machine Company, Winsor & Jerauld Mfg. Company, Builders' Iron Foundry, Standard Machinery Company, California Adding Machine Company, Thomas McWilliams, Allen Fire Department Supply Company, all of Providence; J. M. Carpenter Tap & Die Company, Pawtucket Mfg. Company and E. C. Bliss Mfg. Company, Pawtucket, and Nichols & Langworthy Machine Company, Hope Valley, R. I.

The demands of the union, as briefly mentioned in *The Iron Age* of last week, consist of a 50-hour week, of nine hours daily, with the exception of five hours Saturday; time and one-half pay for overtime work, and double time for holidays, and after midnight for those who are not included in night gangs; a minimum rate of pay for toolmakers of 40 cents an hour, while all machinists, specialists and handymen shall receive an increase of 5 cents an hour over their present rate, and no new machinists shall be employed for less than the prevailing rate; overtime and piece work shall not be compulsory; there shall be one apprentice for each shop and one additional apprentice for each five machinists, each apprentice to serve for four years, and upon becoming a journeyman, shall receive the minimum wage. All apprentices shall receive an advance of 2½ cents an hour. Machinists who have grown old in the service of an employer shall be given preference on light work. In case of failure to adjust a grievance an Arbitration Board of Seven is provided for. If it shall be deemed necessary to reduce expenses, the hours shall be reduced to eight daily, and five days per week before any employee is laid off. There shall be no discrimination against an employee who shall be called from time to time to appear before the management for the adjustment of grievances.

The following statement has been issued regarding strikes now in progress: At the Builders' Iron Foundry 83 men have gone out and 72 are at work; at the Standard Machinery Company 120 men have gone out; at the Nichols & Langworthy Machine Company 36 men went out; at the American Locomotive Automobile Company 160 men went out and 175 remained at work; at H. L. Scott & Co. nine men went out and six remained at work. The additional statement was made that a careful canvass of conditions shows that a large number of the machinists have not yet joined the union and that the claims made by the labor organizers are grossly exaggerated.

Wing's Turbine Fan.

A novel type of fan especially adapted for furnishing mechanical draft for boilers, ventilation and all purposes other than drying, where a movement of air is required, is the turbine engine driven fan, made by the L. J. Wing Mfg. Company, 90 West street, New York. Fig. 1 is a

Fig. 1.—A Disk Fan with Contained Steam Turbine Drive Made by the L. J. Wing Mfg. Company, New York.

general view of the turbine fan, and Fig. 2 shows its details and principle of construction. This company has been making a disk fan for some time, and its new product is an ingenious combination of this fan with a single impeller wheel steam turbine. The blades of the fan are similar to those of an ordinary disk fan and at their upper ends are fastened to a band or ring, one edge of which, as shown in the illustrations, carries the turbine buckets or vanes. Three nozzles are located inside the fan casing equal distances apart, and in position to discharge the steam into the buckets, causing the wheel to rotate. This driving arrangement is claimed to be an economical and convenient one.

Where the fan is used for mechanical draft for boilers three sizes are recommended: a 16-in. fan for boilers up to 150 hp.; a 20-in. size for boilers from 150 to 250 hp., and a 24-in. fan for boilers from 250 to 350 hp., and for larger boilers two fans of a suitable size are manufactured.

It is stated that the steam consumed in driving the fan is ordinarily from 2 to 3 per cent. of that generated by the boiler it is associated with. A test of four 24-in. fans in use in the St. Regis Hotel, made by J. C. Jurgensen, engineer at the hotel, demonstrated that running normally the fans consumed but 2 per cent. of the steam generated.

As can be seen from the illustrations the steam is delivered to the nozzles from a pipe partly encircling the casing which is connected in any convenient manner to the boiler. The small amount of steam issuing from the nozzles, after exerting its energy in driving the fan, passes along with the air, thus doing away with the necessity for an exhaust pipe. This is an advantage in most applications, except where dry air is necessary. When supplying draft to boilers, it is claimed that the steam from the fan helps to deteriorate the clinkers and keeps the grate in better condition. Features on which stress is laid are that the fan occupies less room than the average blower and engine, and has no wearing parts except the ball bearings in the axle, consequently requires no attention beyond oiling about once a month.

Notable Subaqueous Rock Removal.—In the work of increasing the depth of the Manchester Ship Canal, England, from the present 26 to 28 ft., rock cutting under water is said to have been carried on successfully by very interesting means. The rock is pulverized by blows from a series of hardened steel hammers mounted on a barge, and raised by hoisting engines, being then released, as with a pile driver. The hammers carry circular cutters forged from a single ingot of armor piercing steel, and have a removable ogival point similar in form to that at the front end of a large projectile. These points may be replaced without the necessity of removing the cutter bars, which weigh 10 tons each. The bottom of the canal has a width of 120 ft., and consists of sandstone of varying degrees of hardness. The cutters are caused to fall vertically on the same spot until a sufficient number of blows has been given to pulverize the rock to a depth of 3 or 4 ft. The number of blows depends upon the hardness of the material, about 2 cu. ft. being pulverized per blow in average material. The spots attacked are usually spaced 3 ft. on centers, but with variations in some characters of bottom. The pulverized rock is removed by a bucket dredge. The results of the process are said to show an average rate of advance over the full bottom width at the rate of about 36 ft. per day. The average per month shows 6400 cu. yd. of rock broken up at a cost of less than 18 cents per yard.

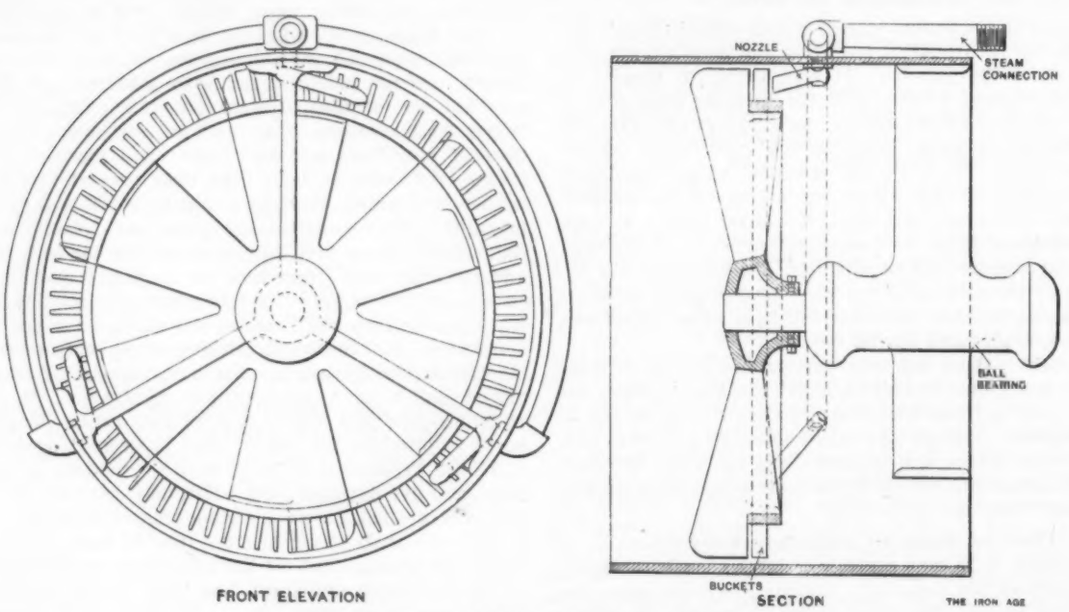


Fig. 2.—Elevation and Axial Section of Wing's Turbine Fan.

The Improved Whitney Mine Car Wheel and Truck.

Whitney car wheels have been made since 1847. In fact, it is stated that A. Whitney & Sons were the first manufacturers of car wheels strictly in the United States. The Whitney wheels have a wide reputation and the improvements in the design of the mining wheel will be of interest to the trade. They are intended for coal, ore or marble cars and contractors' cars generally, and are made exclusively by the Sanford-Day Iron Works, Knoxville, Tenn., successors to A. Whitney & Sons of Philadelphia.

The virtues of the old form of Whitney mine wheel have been retained, these being a construction from a special mixture of iron of long wearing quality, an oil saving design, a hub protected from grit, and ease of running. The hub is closed on the outside and felt packed on the inside to exclude foreign matter. The bearing on

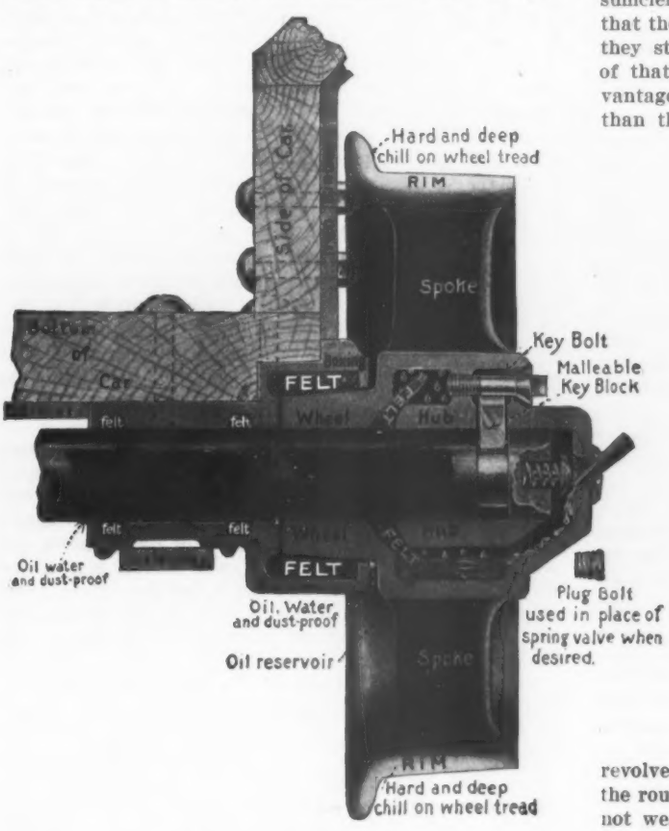


Fig. 1.—Section of the Improved Whitney Mine Car Wheel Made by the Sanford-Day Iron Works, Knoxville, Tenn.

the end of the axle is long, and its center is directly over the center of the rail. The direction in which improvement seemed to be needed was in the oiling device. One problem was to get rid of the side oil plug bolt, which was situated eccentrically in the hub and could be lost out or broken off. Its location made it necessary to revolve the wheel until the oil hole was above the axle, when oil was introduced. Furthermore, time was consumed in taking out and putting back the oil plug bolt.

Spring valve devices were not considered practical for quick oiling, while the valve seat could never be at a point below the level of the oil in the oil reservoir, as a speck of dirt would cause such a valve to leak and waste oil.

Last March patents were issued on the new Whitney center oiling wheel, shown in Fig. 1, which can be oiled just as well in one position as in another. It will be seen that a spring valve is used, but it is at the center of the wheel, where it does not come below the level of the oil reservoir. The valve does not have to give an oil tight joint, as there is no constant pressure of oil on the valve seat. It is merely intended to keep oil from splashing out and to exclude water and grit, and if dirt does get on the seat the oil will not run out. The oil hole is large, so that the oiling may be accomplished quickly. The valve seat can be cleaned with the finger, and the spring can be easily removed, replaced or renewed. In all it constitutes a simple and effective device.

If it should be desirable the plug bolt shown in the illustration can be used and centrally located in the same oil hole as the valve seat, this opening being threaded for that purpose, and the spring and valve may be discarded. This oil bolt is countersunk and cannot be broken off. If left out altogether for a short time, even with the spring valve removed or out of commission, no serious harm will result. The wheel with its hub which forms the bearing on the axle is a single casting, and it is claimed to have an average life of 15 to 20 years. In ordinary operation oiling from 6 to 12 times a year is sufficient.

On mining cars a rigid truck construction is essential. The old form of Whitney truck was not considered sufficiently rigid. Moreover, it was possible and probable that the axles would not be put on the car parallel, and if they started parallel they would easily be knocked out of that relation. In this respect square axles have advantages. Yet the round axle truck is considered better than the square axle truck, for the axle being able to

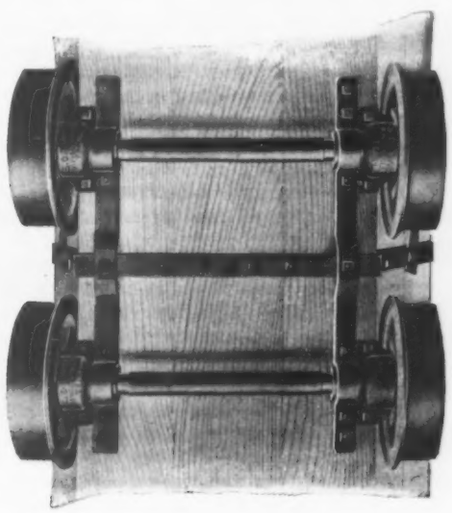


Fig. 2.—The New Whitney Truck Construction.

revolve the car will take curves easier, and also, since the round axles turn in the boxings occasionally, they do not wear flat on one side.

The improved Whitney truck construction shown in Fig. 2 combines the advantages of the square and round axle. Steel axle straps are used which pass over the top of the pedestal boxes, holding the pedestals rigidly in position relative to each other and to the center binder of the car. The truck is held to the car with 22 bolts. It cannot come loose, and it is impossible for the axles to be knocked out of parallel, which cannot be said of a truck attached by the pedestal boxes only. On the rigidity of the trucks depends to a great extent the life of the car, and the true parallelism of the axles has much to do with the avoidance of wrecks, from the wheels skidding instead of turning, and the general easy running qualities of the car.

The longest and largest underground waterway ever undertaken is believed to be the Gunnison tunnel of the Uncompahgre irrigation project in Colorado. The tunnel will have a total length of 30,000 ft. (5.7 miles), a cross section of 10½ x 11½ ft., and will be concrete lined. The maximum water capacity will be 15,000 cu. ft. per second. For the greater part of its length the tunnel is being driven through solid granite, and in some places it is 2000 ft. below the level of the Vernal Mesa, through which it will run. Progress is necessarily slow, the monthly rate being under 1000 ft., or about 35 ft. per day.

Acheson Graphite Lubricant.

An Important Invention in the Lubricating Line.

NIAGARA FALLS, N. Y., May 18, 1907.—The field of lubrication seems on the verge of a revolution through a process discovered by Edward G. Acheson of the International Acheson Graphite Company, Niagara Falls, N. Y., whereby graphite is permanently suspended in water or oil. The merits of graphite as a lubricant have long been recognized, but the difficulty has been to cause it to remain suspended in a liquid, so that it might be conveyed to points requiring its service on bearings. Many efforts to suspend it have failed, the trouble being that the graphite has always settled out of the liquid used after a brief period. Now, however, Mr. Acheson, who discovered the process for making artificial or manufactured graphite, has overcome this, and he has given the world what will be known as the "Acheson effect."

Graphite Made Finer Than Attainable by Mechanical Means.

Under the influence of this invention, for it is not a discovery, the graphite is deflocculated—that is, given a condition of fineness far beyond that attainable by mechanical means. In a deflocculated condition graphite resembles, if not wholly approaches, the molecular state. This "effect" is produced with water and a comparatively small quantity of tannin, and when thus treated graphite remains suspended in the water, showing not the slightest disposition to settle. The ink-like liquid passes with ease through the finest filter paper, and while it is a strange thing to assert, it is a fact that deflocculated graphite possesses the remarkable power of preventing rust or corrosion of iron or steel, which opens a broad field to the graphite water lubricant.

However, in his experiments and work, Mr. Acheson has not been unmindful of the fact that people have been educated to know that water usually causes rust, and that they have been educated to the use of oils for lubricating purposes. This led him to continue his research and experiments beyond the point of accomplishing the feat of permanently suspending the graphite in water, and he has also succeeded in making graphite remain permanently suspended in oil, this liquid also passing freely through the finest filter paper made in America. The results obtained are quite astonishing, especially as it should be understood in this connection that the very lightest and thinnest oils, in which deflocculated graphite is suspended, can be used in place of the heavy and far more expensive lubricating oils of the present day, thus effecting a surprising saving, and this, too, while the graphite lubricants will have better qualities and last longer than the oil lubricants now used.

A New Field of Research.

Mr. Acheson's successful electric furnace work is well known throughout the world, and he has been very careful not to announce his success in deflocculating graphite and other amorphous bodies until he was confident of his results. His success in this, his latest work, is particularly important, because he has not only learned how to deflocculate all amorphous bodies and by that means separate them from crystalline bodies, which are impossible of deflocculation, but he has opened a new field of application and research. The "Acheson effect" is obtained with alumina, lampblack, clay, siloxicon and graphite, the only exception being magnesia, which requires further tests. The deflocculation of amorphous bodies that are used in conjunction with each other, such as clay and graphite in the manufacture of lead pencils, will give a superior product.

Those who have kept in touch with the manufacture of artificial graphite will recall that it was only last year that Mr. Acheson discovered a process for producing a fine, pure, unctuous graphite. When his furnaces gave him this product he at once undertook the working out of the details of its application as a lubricant. In the dry form, or mixed with grease, it was easy to handle, but his ambition was to benefit the world of commerce and industry by having it enter the entire field of lubrication as occupied by oil. During his early efforts to suspend it in oil he met the same troubles encountered by his predecessors in this line of work. The graphite would quickly settle out of the oil. His unctuous graphite was just plain, simple graphite, and it obeyed the same laws covering the natural product, and it will not be surprising if ultimately it is decided that the natural product is amorphous, instead of crystalline, as claimed.

Why Mr. Acheson Uses Tannin.

This was the condition of things, and reflects the frame of mind in which Mr. Acheson found himself in the latter part of 1906. However, he was resourceful. In the consideration of his experiments his thoughts reverted to a series of experiments made by him in 1901. These had as their object the production of crucibles from artificial graphite. This led him to a study of clays, and he learned that American manufacturers of graphite crucibles import from Germany the clay used by them as a bonder of the graphite entering into the crucibles; also that the German clays are more plastic and have a greater tensile strength than American clays of very similar chemical constitution. Chemical analysis failed to account for these decided differences. It was then that Mr. Acheson reasoned that the greater plasticity and tensile strength were developed during the period of transportation from the place of their formation to their final bed, thinking possibly it might be due to the presence of extracts from vegetation being in the waters which carried them. Mr. Acheson made several experiments on clay with vegetable extracts, tannin being one of them, and he found that a moderately plastic, weak clay, when treated with a dilute solution of gallotannic acid or extract of straw, was increased in plasticity. In experimenting with graphite the thought occurred to him that tannin might have the same effect on it as it had on clay. He tried tannin with satisfactory results, and this has given the world the "Acheson effect."

An interesting experiment Mr. Acheson has been seen to make with his disintegrated unctuous graphite was as follows: To one sample of the graphite plain water was added, and after rubbing it in a mortar it was poured into a test tube. To another sample of the graphite and water a little gallotannic acid was added, also a few drops of ammonia, this last not being absolutely necessary, but having been found to improve the results with some waters. This second mixture was rubbed in the mortar as in the first case, and then it was poured into a second test tube. Both of the tubes and their contents were thoroughly shaken, and simultaneously placed in a rack to settle. In about two minutes after the shaking it was found that the graphite in the plain water had very completely settled or separated from the water, while the mixture of water, graphite, tannin and ammonia remained as black as when originally shaken up. The graphite was thoroughly suspended and showed no disposition to separate.

While oil lubricants have been in use many years, petroleum oils have only been known commercially for lubricating purposes for about 40 years, animal oils having been the sources of lubrication previous to that time. Now that it is possible to manufacture a very high grade of graphite in electric furnaces and suspend the product in oil or water, there is every reason to believe that commerce and industry will welcome these new lubricants. Mr. Acheson feels assured that with his disintegrated unctuous graphite, guaranteed to contain less than 1 per cent. impurity, and which can be mixed with oils or grease as may be desired for all specific purposes; with his deflocculated graphite in water for the lubrication of steam engine cylinders and other places and parts where the introduction of oil is objectionable, and with his deflocculated graphite in oil, the quantity carried by the oil to be varied to suit requirements of the most difficult lubrication, he can meet any demand for a lubricant where oil is preferable and evaporation of his water lubricant might be objectionable. O. E. D.

The new steel plant of Milliken Brothers, Incorporated, on Staten Island, N. Y., made a new record on its 28-in. structural mill on May 15, rolling 419 gross tons of finished structural shapes on single turn.

The Machine Tool Builders' Convention.

The spring meeting of the National Machine Tool Builders' Association, which was opened Tuesday, May 14, at Old Point Comfort, Va., was concluded on Wednesday afternoon after two days of sessions, which were replete with interest to the trade. Contrary to the original intention of the members the meeting was not brought to a close at noon Wednesday, but the association adjourned to meet again in the afternoon. The members did not regret the extra session, however, as it was given up to some especially interesting discussions. Representatives of the trade press were granted the privilege of attending part of Tuesday's session and both of the meetings on Wednesday. At Wednesday morning's session, Fred L. Eberhardt of Gould & Eberhardt, Newark, N. J., offered a fiitting resolution on the deaths during the preceding six months of the four members mentioned in the telegraphic report of the opening session published in *The Iron Age* last week. The resolution was passed and copies were ordered forwarded to the families of the deceased.

The Apprenticeship Report.

E. Payson Bullard of the Bullard Machine Tool Company, Bridgeport, Conn., chairman of the Committee on Apprenticeship, submitted his report, which was accepted. The report recommended among other things the adoption of a uniform system of agreement between employers and parents or guardians of the apprentices, and it was recommended that a certain amount of the apprentice's wages be held by the employer as a surety for the good conduct of the employee. It also suggested the adoption of a diploma signed by the officers of the National Machine Tool Builders' Association to be presented at the completion of a satisfactory apprenticeship. Mr. Eberhardt declared that under the New Jersey law an employer has no right to retain any part of the employee's salary, and he recommended that in adopting a form of agreement it be specified that the employee pay from his wages the amount to be held by the employer as a guarantee. He added that, instead of making a mere formality of the rule, employers insist on the money passing from the apprentice to the employer, in order to inculcate in both the mind of both the apprentice and his parent or guardian the understanding that the employer means to deal fairly with the boy.

Mr. Bullard advised that apprentices be paid a graduated scale according to the skill required in the work and the pay that a journeyman receives in the departments to which the boys are apprenticed. He called attention to the fact that employers would profit through the presentation of a formal diploma to apprentices, as they would then be able to give preference to workmen presenting diplomas from shops which they knew turned out skilled mechanics. Mr. Bullard added that apprentices should be carefully instructed, and in this respect an employer should see that they were properly dealt with. Manufacturers are now feeling the need of good men, and there are many shops where employers know they have foremen not up to the standard. Every manufacturer, he added, should do his best to make efficient shopmen of apprentices.

C. H. Norton, of the Norton Grinding Company, Worcester, Mass., urged that the association adopt a diploma as soon as practicable, and added that he has a number of boys in his employ deserving such a recommendation. Mr. Eberhardt spoke in a similar vein, saying that a diploma of the kind recommended would be prized by workmen for sentimental reasons and would create a class of employees whom manufacturers could depend upon as being efficient workmen. A motion was passed that the report of the committee be accepted, and the committee be continued to prepare an appropriate diploma and seal for the use of members of the association. President E. M. Woodward recommended that Mr. Norton, who showed himself to be particularly earnest over the adoption of a diploma, be added to the committee and the suggestion was adopted.

President Woodward and Secretary P. E. Montanus presented a report of the meeting of the Society for the Promotion of an Industrial Education held at Washington, January 14, 15 and 16 last, which contained a review of the proceedings of the organization. Mr. Bullard declared that the session in question resulted in the advancement of many wide ideas, and brought forward numerous theorists, but he expressed himself as being heartily in accord with many of the ideas advanced.

The Reliability of the Foundryman.

The subject of the reliability of the foundryman was brought up by Mr. Norton, who advanced the opinion that most machine tool builders dealing with foundries experience more or less trouble in getting castings made according to their plans. He declared that it is the general rule that foundries do not return all the patterns sent them, and continuing, said: "We have one man who spends his whole time findings castings which the foundries say are not in their shops, and we have another man who visits the foundries all of his working time inspecting molds with the idea of saving the labor put into the castings before the founder discovers that there are errors in the mold. If the casting is made too short, which is frequently the case, we cannot very well repair them, but we can and do repair blow holes and the like. We find our principal trouble, however, in the fact that the founders do not follow the blue prints given them. The association should insist on getting castings according to the blue prints sent out and not allow the molders to pry a core plate off at one place and put it on another because it is more convenient to mold. Now what should we have in our contract and what can we do as an association, if anything, to brace our foundry friends up?"

Mr. Bullard advised that manufacturers who are not satisfied with their foundry service prepare to build foundries of their own. This, he said, had been found successful as regards his company. Mr. Montanus added that his firm had built a foundry and found that it was paying, but he added in defense of the foundryman that the latter is dealing with unknown conditions when he closes up his mold. "I believe," he said, "that if you have your contract clearly defined you will have no trouble with the foundryman, but you will have trouble with bad castings as long as you are dealing with melted iron. The foundryman is not as high up on the art of getting prices as the machine toolmen are, and he is under a burden put on him by the molders' union. It would be well to give the foundrymen suitable prices for their work and let the price govern the quality of the casting."

Mr. Eberhardt said that his firm insures that its castings contracted for are properly made by sending a man to inspect the mold before the casting is poured. He declared that by keeping a close watch on the founder with whom they have placed contracts his company has got fairly good results. He did not quite agree that molds were closed up blindly, and said that his experience was that foundrymen gave care to their work, and he added that in ordering castings a customer should expect to have the job done right within reasonable limits. At his suggestion a committee consisting of C. H. Norton, P. E. Montanus and P. G. March, was appointed to discover the ways and means of placing the responsibility of bad castings on foundrymen.

Claims of Buyers.

At the afternoon session Mr. Bullard brought up the subject of claims of buyers against manufacturers, and declared that he hoped that the association could come to some agreement as regards terms with purchasers as to repairs and claims or imperfect machines. He read a contract adopted by automobile manufacturers stipulating that they would not be responsible for breakages after repairs had been made in other shops, and accepted no responsibility for promises made by agents imposing concessions not granted by the manufacturer.

A committee consisting of Mr. Bullard and Murray Shipley of the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio, was appointed to look into the matter and prepare a suitable contract to be presented at the next meeting.

Catalogues and Expositions.

The subject of adopting a standard size for catalogues gave rise to but little discussion, but a vote was taken to get the sense of the members in the matter, and the large majority of the manufacturers expressed themselves as being in favor of a 6 x 9 in. catalogue. Six members favored a 9 x 12 in. size, and only one expressed the liking for a 3½ x 6 in.

The question of whether exhibits at railroad and automobile shows pay brought forth a general discussion on the subject of showing machines at all classes of expositions.

C. Wood Walter of the Cincinnati Milling Machine Company, Cincinnati, Ohio, stated that the foreign agents of his firm insisted on having exhibits at European expositions, but he added that the exposition idea in Europe is more important than it is here. He thought that exhibiting had been overdone in this country as far as standard tools were concerned. Mr. Bullard advanced the same opinion with the idea that many manufacturers go in because they know their competitors are to have a showing. E. C. Henn of the National Acme Mfg. Company, Cleveland, Ohio, declared that his experience taught that exhibiting at such shows is hardly practicable unless it is a trade exhibition. Mr. Montanus stated that his firm had exhibited at the Paris Exposition and subsequent similar shows in this country, and had discovered that as a rule such shows did not pay a machine tool exhibitor. He advised that it be adopted as the sense of the meeting that exhibitions of that class are not profitable. V. M. Hatch of the Builders' Iron Foundry, Providence, R. I., gave it as his opinion that exhibitions at foreign expositions paid, but such shows in this country did not always pay. A committee composed of Mr. Henn, F. M. Huschart of the Bickford Drill & Tool Company, Cincinnati, Ohio; C. E. Thwing, Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass.; C. J. Wetsel, Baush Machine Tool Company, Springfield, Mass., and C. H. Besly, C. H. Besley & Co., Chicago, Ill., was appointed to report at the next meeting on the question of whether such shows are profitable for machine tool builders.

The Henry Wright Drill Company, Hartford, Conn., and the Kern Machine Tool Company, Cincinnati, Ohio, were made members of the association.

Apprenticeship Terms and Agreements.

The report submitted by E. Payson Bullard of the Bullard Machine Tool Company, Bridgeport, Conn., as chairman of the Apprenticeship Committee, contained forms of apprenticeship agreements and drafts of terms to be entered into between employers and apprentices. The report was based on replies from members of the association and other manufacturers to a list of questions sent them as to their experience in indenturing apprentices. The terms of apprenticeship and forms of agreements recommended by the report are as follows:

TERMS OF REGULAR APPRENTICESHIP.

to

.....

of

.....

Manufacturers of Machine Tools and members of the National Machine Tool Builders' Association.

1. Application must be made in person. When satisfactory the applicant's name will be registered and due notice given when he is required to commence work. Applicant must be at least 17 years of age.

2. The applicant must, before commencing work, execute, together with some responsible surety, an agreement in the form hereto annexed.

3. A trial period of 1000 hours will first be required, after which, should the apprentice prove satisfactory, he will begin his term of service, which will be three years of 2900 hours each.

4. If during this period of trial an apprentice should, in the opinion of said company, prove deficient in capacity or unsatisfactory in deportment, notice to that effect shall be given to said apprentice and his surety and the contract of apprenticeship shall become absolutely void.

5. On completion of the trial period the apprentice will be given the use of a new equipment of tools, which will be the property of the company; but on satisfactory completion of the term of apprenticeship said equipment of tools will be given to the apprentice free of charge.

6. The wages of apprentices shall be as follows: For the first 1000 hours, or period of trial, and the first year, 8 cents per hour; for the second and third years thereafter, 10 and 13 cents per hour, respectively, will be paid.

7. Wages will be paid on the regular pay days of the company as they may, from time to time, be established, except that the money earned during the trial period will be retained by the company until the apprentice shall have completed his term of service, when he will be paid that amount, unless it shall be forfeited as otherwise herein provided.

8. Lost time shall be made up at the expiration of each year, at the rate of wages paid during said year, and no year of service shall commence till after all time lost by the apprentice in the preceding year shall have been fully made up.

9. It is also expressly understood and agreed that at any time when from any cause whatsoever orders shall fall off, making it necessary to shorten the hours of labor or close the works or department, the said company reserves the right to suspend the force of apprentices wholly or in part, making payment only for the time actually worked.

10. The company will faithfully instruct the apprentice in the machinists' art or trade in their shop in..... during his said term of apprenticeship.

11. Applicants who may have served terms of special apprenticeship, or who may be graduates of technical schools, shall be entitled to such credit of time on period of service as regular apprentices, and an increase in wage rates, as may be mutually agreed upon.

12. Apprentices will be required to perform their duties with punctuality, fidelity and diligence, and to conform to the rules and regulations which are or may be adopted from time to time for the good government of the shop; and the company reserves to itself the right, at its sole discretion, to terminate the agreement and discharge an apprentice from further service, for any unfaithfulness, nonconformity with such rules and regulations, want of diligence to his business, or improper conduct in or out of the shop. In case of such discharge, or in the event that said apprentice shall abandon his apprenticeship before the expiration thereof, without the consent of said company, the apprentice shall forfeit all wages then earned and unpaid, together with the money earned during the period of trial, retained by the company as a guarantee of good faith.

AGREEMENT—REGULAR APPRENTICESHIP.

I. This agreement is made and entered into this..... day of....., 19....., by and between....., a corporation located and doing business in the city of....., State of....., hereinafter known as the "Company"; and.....of....., hereinafter known as the "Apprentice"; and..... of....., hereinafter known as the "Surety."

II. For the purpose of acquiring the art or trade of machinist.....hereby becomes the apprentice to the company and the company hereby accept said..... as an apprentice in the art and trade of machinist; each party in accordance with and subject to the "Terms of Apprenticeship" hereto annexed and made a part hereof.

III. And the said....., as surety, hereby guarantees that the said apprentice shall well and truly conform with and abide by all the provisions of said "Terms of Apprenticeship," and shall in no wise violate any of its provisions, and that said apprentice shall not abandon said apprenticeship before the expiration thereof.

IV. And it is fully understood and agreed by the said apprentice and his surety that the company shall have the right at any time to discharge said apprentice for unfaithfulness and noncompliance with the rules and regulations of the shop, want of diligence, indifference to business, or improper conduct either in or out of the shop. In event of such discharge, or should the said apprentice abandon such apprenticeship before the expiration thereof without the consent of the company, all wages then earned and unpaid, together with the money earned during the period of trial, and retained by the company as guarantee, shall be forfeited.

V. It is further agreed by said company that in the event that said apprentice shall remain its apprentice during the full term of apprenticeship (including the making up of lost time), and shall in all respects comply with the provisions of the "Terms of Apprenticeship" hereto annexed, to present said apprentice with the equipment of tools, the sum of..... dollars which was earned during the trial period, together with the diploma bearing the seal of the National Machine Tool Builders' Association.

In witness whereof the three parties to this agreement made in triplicate, hereto set their hands and seals, the day and year first above written.

.....

TERMS OF SPECIAL APPRENTICESHIP.

In that branch of the machinists' art and trade designated in the agreement hereto annexed.

To

.....

of

.....

Manufacturers of Machine Tools and members of the National Machine Tool Builders' Association.

1. Application must be made in person. When satisfactory the applicant's name will be registered and due notice given when he is required to commence work. Applicant must be at least 17 years of age.

2. The applicant must, before commencing work, execute, together with some responsible surety, an agreement in the form hereto annexed.

3. A trial period of 240 hours will first be required, after which, should the apprentice prove satisfactory, he will enter his term of service, which will be computed from the beginning of the trial period. The wages of the apprentice during period shall be the same as paid for the first period for the branch herein specified.

4. If during this trial period an apprentice should, in the opinion of the company, prove deficient in capacity or unsatisfactory in deportment, notice to that effect shall be given to said apprentice and his surety, and the contract of apprenticeship shall become absolutely void.

5. On completion of the trial period the apprentice will be given the use of a new equipment of tools adapted to the work upon which he is employed, which will be the property of the company; but on satisfactory completion of the term of apprenticeship, said equipment of tools will be given to the apprentice free of charge.

6. The branches of the machinists' art and trade, with the respective number of working hours required, inclusive of trial period, and the wages per hour, are as follows:

Turning:
2 years of 2900 hours each.
Wages, 12 cents per hour first period of six months.
Wages, 14 cents per hour second period of six months.
Wages, 16 cents per hour third period of six months.
Wages, 18 cents per hour fourth period of six months.

Vertical Boring Mill:
1½ years of 2900 hours a year.
Wages, 15 cents per hour first period of six months.
Wages, 17 cents per hour second period of six months.
Wages, 20 cents per hour third period of six months.

Horizontal Boring Mill:
1½ years of 2900 hours a year.
Wages, 15 cents per hour first period of six months.
Wages, 17 cents per hour second period of six months.
Wages, 20 cents per hour third period of six months.

Planing:
1½ years of 2900 hours a year.
Wages, 12 cents per hour first period of six months.
Wages, 14 cents per hour second period of six months.
Wages, 16 cents per hour third period of six months.

Milling:
1½ years of 2900 hours a year.
Wages, 15 cents per hour first period of six months.
Wages, 17 cents per hour second period of six months.
Wages, 20 cents per hour third period of six months.

Drilling:
1 year of 2900 hours.
Wages, 15 cents per hour first period of six months.
Wages, 17 cents per hour second period of six months.
Wages, 20 cents per hour third period of six months.

Grinding:
1 year of 2900 hours.
Wages, 15 cents per hour first period of six months.
Wages, 17 cents per hour second period of six months.
Wages, 20 cents per hour third period of six months.

Erecting:
1½ years of 2900 hours a year.
Wages, 15 cents per hour first period of six months.
Wages, 17 cents per hour second period of six months.
Wages, 20 cents per hour third period of six months.

Turret Machine:
1 year of 2900 hours.
Wages, 15 cents per hour first period of six months.
Wages, 17 cents per hour second period of six months.
Wages, 20 cents per hour third period of six months.

Vise Work:
1½ years of 2900 hours a year.
Wages, 15 cents per hour first period of six months.
Wages, 17 cents per hour second period of six months.
Wages, 20 cents per hour third period of six months.

Scraping:
1½ years of 2900 hours a year.
Wages, 15 cents per hour first period of six months.
Wages, 17 cents per hour second period of six months.
Wages, 20 cents per hour third period of six months.

7. Wages will be paid on the regular pay days of the company as they may, from time to time, be established. The sum of 2 cents per hour will be retained from said wages by the company for the first year of 2900 hours, this sum to be forfeited by the apprentice should he fail to complete his contract to the satisfaction of the company; but the same to be paid by the company to the apprentice on the completion of his apprenticeship in a satisfactory manner.

8. Lost time shall be made up at the expiration of each year at the rate of wages paid during said year, and no year of service, or fraction thereof, shall commence until after all time lost by the apprentice in the preceding year shall have been fully made up.

9. It is also expressly understood and agreed that at any time when, from any cause whatever, orders should fall off, making it necessary to shorten the hours of labor or close the works, the said company or department reserves the right to suspend the force of apprentices wholly or in part, making payment only for the time actually worked.

10. The company will faithfully instruct the apprentice in their shop in.....during said term of apprenticeship, in that branch of the machinists' art and trade specified in the agreement hereto annexed.

11. Special apprentices who have completed their term of apprenticeship, wishing to become regular apprentices, may do so upon executing the articles of agreement; the time served as special apprentice shall entitle said apprentice to such credit of time on period of service as regular apprentice, and an increase in wage rates, as may be mutually agreed upon.

12. Apprentices will be required to perform their duties with punctuality, fidelity and diligence, and to conform to the rules and regulations which are in force, or may be adopted from time to time for the good government of the shop; and the company reserves to itself the right, at its sole discretion, to terminate the agreement and discharge an apprentice from further service for any unfaithfulness, nonconformity with such rules and regulations, want of diligence, indifference to his business, or improper conduct in or out of the shop. In case of such discharge, or in the event that said apprentice shall abandon his apprenticeship before the expiration thereon without the consent of the said company, the apprentice shall forfeit to said company all wages then earned and unpaid, together with the money earned during his apprenticeship, retained as guarantee, as per section 7.

AGREEMENT.—SPECIAL APPRENTICESHIP.

This agreement is made and entered this.....day of ....., 19. .., by and between....., a corporation located and doing business in the city of....., State of....., hereinafter known as the "Company," and.....of....., hereinafter known as the "Apprentice," and.....of....., hereinafter known as the "Surety."

1. For the purpose of learning the trade of....., ... hereby becomes the apprentice to the company, and the company hereby accepts said..... as an apprentice in the trade of....., beginning on the.....day of....., 19...., in accordance with and subject to the "Terms of Apprenticeship" hereto annexed and made a part hereof.

2. And the said....., as surety, hereby guarantees that the said apprentice shall well and truly keep, conform to and abide by all the provisions of said "Terms of Apprenticeship," and shall in no wise violate any of its provisions; and further, that said apprentice shall not abandon said apprenticeship before the expiration thereof.

3. And it is fully understood and agreed by the said apprentice and his surety that the company shall have the right at any time to discharge said apprentice for unfaithfulness or noncompliance with the rules and regulations of the shop, want of diligence, indifference to business, improper conduct either in or out of the shop. In the event of such discharge, or should said apprentice abandon such apprenticeship before the expiration thereof, without the consent of the company, all wages then earned or unpaid, together with all the money earned or retained by the company as guarantee of good faith, shall be forfeited by said apprentice.

4. It is further agreed by said company that in the event that said apprentice shall remain its apprentice during the full term of apprenticeship (including the making up of lost time), and shall in all respects comply with the provisions of the "Terms of Apprenticeship" hereto annexed, to present said apprentice with the equipment of tools, the sum of..... dollars retained by the company as aforesaid, together with the diploma bearing the seal of the National Machine Tool Builders' Association.

In witness whereof the three parties to this agreement, made in triplicate, hereto set their hands and seals, the day and year first above written.

.....

The report also contains a form of diploma to be adopted by the association together, with lists of the tools to be given by employers to apprentices at the beginning of their term of employment.

The Pittsburgh Automatic Vise & Tool Company, Pittsburgh, has made plans for exhibiting at the convention of Master Car Builders and Master Mechanics at Atlantic City, N. J., June 13 to 20, the largest vise ever constructed. The tool will be operated by electricity, the double swivel movement being visible at all times, the tool weighing 695 lb., and having a jaw opening of 15 in. The company reports a heavy demand for this special type of vise.

The stocks of iron ore on the various merchant docks on Lake Erie—namely, those at Toledo, Sandusky, Huron, Lorain, Cleveland, Fairport, Ashtabula, Conneaut, Erie and Buffalo—were 1,976,988 gross tons on May 1, 1907, as compiled by the *Marine Review*. This compares with 1,791,090 tons on May 1, 1906, and 2,271,631 tons on May 1, 1905. Winter shipments from the docks to furnaces were 4,275,467 tons, as against 4,672,638 tons in the winter of 1905 and 1906.

THE IRON AGE

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The Iron Age Directory.

The Eleventh Annual Edition of THE IRON AGE DIRECTORY is now being mailed by the David Williams Company to all subscribers of *The Iron Age*, free of cost. It will be found that this edition is considerably larger than any of its predecessors, comprising 331 pages, giving the names and addresses of 1436 concerns regularly advertising in *The Iron Age*. It is much more valuable than any previous edition, as it contains many new names of manufacturers in various lines, and also includes a far larger number of articles, having no less than 6823 heads and 2066 cross heads. It is being found of increasing value by all classes of purchasers of manufactures of iron and steel, machinery, hardware, &c., and we are confident that the new edition will still further meet the necessities of buyers in these lines. It includes many specialties which are not usually indexed, and the sources of supply of which are ordinarily traced only with great difficulty. The book is now bound in stiff covers, and in its new form will more efficiently meet the hard service of daily use.

The Passing of Machine Shop Restrictions.

The principle of the freedom of employers to manage their works was the prime factor in the famous agreement of 1898 between the Employers' Federation in the British engineering trades and their employees belonging to the Amalgamated Society of Engineers. At the same time the right to work piece work, which had been enforced by many of the associated employers before the great engineering strike which this agreement ended, was extended to all members of the federation. It will be remembered that an attempt to secure in the United States a similar agreement between machine shop proprietors and the union machinists, represented by the officers of the International Association of Machinists, was thought at first to have been successful. The New York conference of May, 1900, resulted indeed in an agreement which was heralded as likely to go far toward preserving peace in the machine shops of the United States. But these hopes were soon disappointed. It was charged by representatives of the manufacturers that when the officers of the machinists' union presented the New York agreement to the various locals they left out two clauses, one requiring the men to work harmoniously in shops where nonunion men were employed, and the other doing away with shop restrictions which previously had set an arbitrary limit to a mechanic's output. The abrogation of the agreement soon after the conference of 1900 is a matter of well-known history. Since that time the National Metal Trades Association and the International Association of Machinists have gone their several ways, and the principle of the open shop, free from arbitrary limitation of output, has made marked headway in the machinery trades of this country.

Elsewhere in this paper is given the new agreement drawn up by representatives of the federated employers and the representatives of the three engineering trades unions in Great Britain. It does not present any important departures from the agreement of 1898. Perhaps that fact is the most noteworthy one in connection with this agreement, since the union machinists of Great Britain have presumably been able to repair much of the damage done to their organization by the strike of 1897. In the past nine years the parties to the original agreement have been working on a conference basis, and have settled their disputes without strikes of any great importance. Special attention may be called to the distinct recommendation of the union representatives that their members do not object to working with nonunion men; also to the fact that there is no recognized proportion of apprentices to journeymen, this being a question which the employers agree to discuss with the unions. The reiteration of the right of employers to appoint the men they consider suitable to operate machines and to determine the conditions under which the machines shall be worked, indicates no disposition of the unions to return to the old dispensation under which they imposed restrictions upon output. In Great Britain the once powerful shibboleth, "one man one, machine," is a dead letter.

Broadly stated, the paramount contention between employers and unions is over the question which side shall control the operations of the shop. It would appear that definite progress is being made both in Great Britain and the United States toward the retirement of the union idea of controlling output by decree—a fact that offsets greatly some of the claims of numerical increase in important unions. It is highly significant that in recent years, while wage advances have not been difficult to secure, employers have resisted more successfully than ever demands which involved supervision of shop operations and regulation of output by union committees.

Manufacturers as Salesmen.

One of the most impressive papers recently presented for the consideration of business men was read by Abram C. Mott of the Abram Cox Stove Company, Philadelphia, before the late convention of the National Association of Stove Manufacturers, held in this city. The author took for his text, "The Relative Importance of Stove Manufacturing Details," and proceeded to show the manufacturers of stoves wherein they are making the most serious mistake in the conduct of their business. The point he brought out so strikingly is of such general application in the management of manufacturing enterprises that it is commended to the careful consideration of other manufacturers as well as those who make and sell stoves. The purpose of Mr. Mott's paper was to direct the attention of stove manufacturers to what he considers the department of supreme importance in the conduct of their business. He makes himself so plain on this point that his language should be quoted in full, as follows:

> The stove manufacturing industry probably furnishes the most striking example in existence, on a large scale, of a general failure to realize the relative importance of the different departments of a business. Their methods and actions and policies prove that nearly all stove manufacturers are victims of the delusion that the manufacturing department is the department of supreme importance and that the commercial or sales department is of minor consequence. In the manufacturing department they strain at a gnat, and in the sales department they swallow a camel. To the purblind stove manufacturer

molehills are mountains in the manufacturing department, while mountains are molehills in the sales department.

Is this not the case in many other branches of the manufacturing industry? Do not manufacturers almost universally apply themselves with unflagging diligence to the perfection of all the details of the manufacturing department—if proving the efficiency of their machinery, raising the standard of the output per man, enforcing methods by which the cost of production may be cut down—and at the same time allow the selling department to engage in practices which play havoc with profits? Mr. Mott, who as a manufacturer has made his impress on the stove trade and one that is recognized at full value in the West as in the East, states emphatically, as the result of his years of observation and experience, that it is the management of the commercial end of any concern engaged in the stove business that determines almost wholly the rate of profit earned by the establishment. If true in the stove trade is it not equally true in other lines? The principles underlying all business are the same.

An interesting part of Mr. Mott's paper is his reference to the labor question, which he handles in an utterly fearless way. He does not belittle its importance, but he shows how it may be overshadowed by what happens in the commercial end of an establishment that has gone through the throes of a settlement of molders' wages. He says:

In the manufacturing department, and, indeed, in the whole business, the one problem that looms largest in the mind of the stove manufacturer is the molding price question. If a manufacturer is called upon by his molders to pay 10 cents more than what he regards as a fair price for molding a stove he plans an elaborate campaign of resistance to prevent such an awful calamity from falling upon him. Able ambassadors of adjustment, men specially retained by an expensive organization for such emergencies, hurry across the continent in answer to his appeal for help, and finally, with a sore and chastened spirit he reluctantly submits to a compromise whereby he pays only 6 cents more than he had proposed paying for molding that stove.

But when he is called upon by a customer or by a salesman to reduce the selling price of that stove $1, $2 or even $3 below a just and proper figure he summons no assistance, he demands no protection, he experiences no excitement, but he cheerfully and willingly makes the reduction.

How frequently we have seen a similar occurence in some other branch of manufacturing. Week after week mills or factories have been closed, while representatives or owners and operatives have struggled over the question of an advance or a reduction in wages of perhaps 5 per cent., when that particular item of labor represented at the maximum rate under 10 per cent. of the current selling price, and as soon as the question was settled have we not known some of the most implacable of the owners to proceed to gather in all the business they could at a price cut considerably more than the labor difference under dispute? Mr. Mott drives this point a little further in by making the following statement:

Many a stove manufacturer will dispute with his molders for six months over a few cents in the molding price of a stove, but will, if a little pressure is exerted by a shrewd buyer, sell the same stove at a reduction below a profitable price of more than the entire molding cost of the stove. We may gauge to some extent the trivial relative importance of this molding price question, which gives stove manufacturers so many anxious days and sleepless nights, by realizing that 5 per cent. on the molding price would be more than covered by 1 per cent. on the selling price. Yet there is no manufacturer here who would not resist to the death a demand for an advance of 5 per cent. in molding prices applying specially to him, while at the same time he will show the utmost laxity in his sales policy, granting concessions of 5 or 10 per cent. from his prices without the slightest appreciation of the enormous inroads that such concessions make on his profits.

Here is much food for thought certainly on the part of stove manufacturers, but just as surely in the case of manufacturers in other lines who care to make the application. Emphasizing the importance of the commercial department by showing the limitations of the manufacturing end, he says: "It matters not how much thought and care and attention you may give to your manufacturing department, the scope for economies and savings therein is extremely narrow. All stove manufacturers must pay practically the same prices for their materials; and the chief items of labor cost can be compressed by the utmost effort to such a limited extent that any advantage thus gained will constitute an almost infinitesimal item in the cost of a stove." Alluding to the late James Spear of Philadelphia, Mr. Mott said:

America's most successful stove manufacturer, from the standpoint of wealth actually amassed in the stove business, was a man who never really made a stove in his life. With great care and skill he made *patterns* for his stoves, for he rightly considered the pattern shop a part of the sales department. It was his theory that there is little or no profit in the manufacturing end of the stove business, but that the profits must be largely or wholly made by the skillful selling of the goods. He was perfectly content to pay the manufacturer the price which the latter demanded for making the stoves from his patterns, and he devoted his undivided attention to marketing the goods.

That his theory was sound is attested by the fact that he accumulated a fortune entirely in the stove business of over $1,250,000. He died 12 years ago. His fortune would probably be equivalent to $2,000,000 at the present time. This shining example for stove manufacturers never did a large stove business, and never covered any large extent of territory in his operations. He never demoralized the market, and never injured a competitor by his methods of selling his goods. He probably realized more forcibly than any other stove manufacturer who went before him or who came after him the immense importance of subordinating every detail of his management to the one end of securing profitable prices.

Every proposed policy, every new pattern, every scheme of sales promotion had but one object—to get good prices. He never feared the loss of a customer, for he had a well founded faith in his ability to market enough goods at his own prices to maintain a satisfactory volume of sales.

The stove manufacturers assembled at this convention were so impressed by the practical points presented for their consideration that they took immediate steps to endeavor to carry the suggestions into effect. Other manufacturers in numerous lines could profitably follow their example.

Power Plant Diaries.

Station log books, or records in some form, of fuel and water consumption, hours of labor and times of putting machines in and out of service are kept in all well operated power plants, but the usefulness of an engineer's diary is less generally appreciated. Many engineers may not favor such extra clerical work, but where the habit of recording important happenings day by day is not a serious burden, the operating company is likely to find it of value.

In a recent instance a company operating a suburban power plant purchased a new engine, which did not give satisfaction. For over six months the manufacturer endeavored to correct the faults, supplying new parts, making valve adjustments and altering details of the bearings and other mechanism until the outfit had been practically rebuilt. During the entire period the manufacturer kept from two to six men at work on the machine several days in each week. The executive office of the operating company finally concluded that the machine was a failure, and to secure definite data supporting its contention asked the chief engineer to submit to the general manager the next morning, for use at a directors' meeting, a general statement of the machine's history from the time of installation. The engineer referred to a station diary which he always kept and dictated a complete account of each day upon which work was done in connection with the troublesome unit. On the basis of these detailed statements the company decided to substitute another engine for the first, and the engineer had the satisfaction of fulfilling a difficult request with very little trouble.

It might seem that each day's runs in a modern power plant are so much alike that there is little to record except the usual data of the log sheet. Such is not the case, however. The larger the plant the more important it is to keep on file the dates of various repairs, arrival of fuel and supplies, conferences with officials, accidents, shutdowns, unusual overloads, the construction of additions to the equipment and buildings, labor of contractors, visits of supply men and other similar incidents. When the company's business is carried into the courts such records may be invaluable; in the ordinary course of operation they may settle many disputed points quickly, and the keeping of a power plant diary only involves a few moments' work each day by the chief engineer.

The German Steel Syndicate.

Great expectations seem to have been formed in Germany over the renewal of the Steel Syndicate. *Stahl und Eisen* discusses the situation from a patriotic point of view, and incidentally furnishes some details which have not yet found their way into print on this side of the Atlantic:

In the past the management of the Steel Syndicate has aimed, with energy and skill, to work out international arrangements. It may be expected that in the future the syndicate will follow a policy of protecting national labor and prevent any throwing away of its products in the world's markets. Many a former dumping ground has become an outlet yielding a good profit. Such a nursing of export trade will be accepted with gratitude, since it goes hand in hand with the interests of our domestic finishing industries and their supply of raw material.

The financial and ideal profits of the export trade of the syndicate naturally accrue chiefly to the steel works, since they were attainable only by the consolidation into one body. "One for all and all for one," is the motto, and it will be a difficult matter to figure out in detail who has the greatest advantage from the syndicate. Dependent upon the world's market, the German iron industry must be prepared for the sharpest competition. Without the Steel Syndicate the industry would be incapable of the struggle, in spite of the tariff protecting the home trade, and it could not resist the powerful aggression of the Steel Trust. The American danger does not exist only while the German iron industry forms a closed body. If it fell to pieces, the Steel Trust would be master of the world's markets of iron and steel, while to-day it offers its hand for international arrangements, since its clever commercial management is guided at all times by the principle of the greatest profit, and this is offered by the arrangement with strong competitors.

A divided German iron industry would have to fear from the Steel Trust in the world's markets, since the latter is financially much stronger and sounder than it is generally given credit for to-day. Its formerly undoubtedly heavily watered capital has been unwatered by the fact that since its organization improvements and extensions to the extent of several hundreds of millions of dollars have been made. Even if one is not ready to go so far as to hold that the mining property of the subsidiary companies of the Steel Corporation is worth the total capital of those companies, yet there is no doubt that the aggregation of all these factors of production from the raw material to the final products gives a higher value to the capital employed in them than it would possess if they were separate and unorganized.

In the face of such powers operating in the world's markets a failure to renew the Steel Syndicate would have had consequences which could not have been foreseen. The state, too, will accept the renewal with greater satisfaction since the Steel Syndicate raises the capacity to bear taxes of the steel industry without impairing the taxpaying capacity of other branches of industry. It is to be hoped, therefore, that the state will allow it to develop in the future as it has done in the past. The Steel Syndicate has fully earned the right to manage its own affairs, since it would never have been organized without fully developed restraint of power. The state, therefore, has no adequate reason to restrict the right of self-management on the part of the largest German syndicate, but, on the contrary, has every reason to hold back the unnecessary and injurious efforts of tendencies toward invoking the police powers of the state. The chief of the Bureau of the Interior of the Empire has only lately condemned this eloquently in dealing with politico-social questions.

The new Steel Syndicate is an improvement in important points over the old organization. The new syndicate is rid of a number of special contracts, which has made the accounting more uniform, and by admitting the Westfaelische Stahlwerke a gap has been filled. Above all, however, a number of sharp controversies over freights have been overcome by a table of freight rates which gives expression to the advantages and disadvantages as to freights growing out of the geographical position of each plant, the table of freights being based on shipment from the mill for all products. In the question as to the position of the dealers, which first created great difficulties and which did lead to the dissolution of the Upper Silesian Syndicate, a solution on the basis of principle has been arrived at, which, it is hoped, will lead to a satisfactory regulation of the structural trade, and will maintain the existence for the smaller dealers. The Silesian works which affected the Steel Syndicate have entered it individually.

The management of the syndicate has been simplified by dropping the former auxiliary committee. On a number of questions voting power has been given to the B products, which makes it possible for the works which are most heavily interested in this branch to obtain better representation. The allotment of A products is now 6,054,084 tons, of which 1,348,755 tons is billets, &c., 2,381,765 tons is track material, and 2,323,564 tons is shapes. The total of B products is 5,817,533 tons, distributed to 3,304,991 tons of bars, 741,806 tons of wire rods, 960,827 tons of plates and sheets, 138,672 tons of tubes, 622,237 tons of castings and forgings, and 49,000 tons of Silesian semi-finished material. The total of A and B products, therefore, is 11,871,617 tons. The decline in the allotment of steel billets, blooms, &c., is explained by the merger of Phœnix, which was the far greatest consumer of billets, and of Hoerde, and the consolidation of Hoesch and Hohenlimburg. Phœnix has the largest participation, with a total of 1,129,631 tons, followed by Krupp with 976,917 tons and Deutscher Kaiser and Thyssen & Co. with 974,325 tons. The work of the syndicate will be to get the work for the allotments, which have been increased to the extent of 4,400,000 tons over the figure of 1904.

Engine Balancing Experiments.—Recent experiments in balancing engines described in a paper by Professor Dalby before the British Association indicate that the two-cylinder-opposed type of engine, so extensively used in automobiles, may have its reciprocating parts balanced with a greater degree of exactness than any other form of engine. With this construction, also, very short connecting rods may be used with less objectionable results than in engines with cylinders not opposed. With the four-cylinder construction it was shown to be possible to so arrange the cranks and masses of the pistons that balancing in the horizontal direction can be accomplished completely, without, at the same time, introducing any unbalanced forces vertically. The balance between cranks of the four-cylinder model was shown to be exceedingly delicate, a 10-degree alteration of angle between middle cranks creating violent oscillations.

The Pennsylvania Railroad Company will plant 20,000 acres of land in the Allegheny Mountains with trees of a kind to produce ties for railroad track. Assistant United States Forester E. A. Sterling has been put in charge of the company's new forestry bureau. It may be 40 years before these trees will be available.

A New Agreement with British Machinists.

Publication has been made in Great Britain of the text of the new agreement made on March 22, 1907, between the Engineering Employers' Federation on the one hand and on the other the three engineers' or machinists' unions, known as the Amalgamated Society of Engineers, the Steam Engine Makers and the United Machine Workers' Association. It will be recalled that in 1897 the employers' organization, after a memorable struggle, defeated the engineering trades unions in their strike for the eight-hour day, and that in the following year an agreement was signed in which the unions acknowledged their defeat and receded from the closed shop and other long standing restrictions. The unions some months ago expressed a desire to have a new agreement drafted and the employers acquiesced. As the result of joint conferences a new agreement was prepared and signed provisionally by the representatives of both sides. It now awaits ratification by the various organizations represented.

The text of the new agreement, which is a noteworthy document in several respects, is given below. It will be seen that the union representatives recommend to all their members that they do not object to working with nonunion workmen; also that there is no attempt to specify a ratio of apprentices. The right to limit the number of apprentices is one that trade unions have insisted upon from time immemorial. It will be noted also that the unions waive their old-time dictum of one man one machine, and that the right of the employer to select the men best adapted to particular work and to specify what machines they shall operate is conceded.

The statement is made that concessions were granted by both sides, but it does not appear that any principle asserted by the employers at the time the settlement of 1898 was made has been waived. The agreement which ended the great strike had more the tone, perhaps, of articles of capitulation, and emphasized the things the employers would not tolerate. The new agreement eliminates some references to the strike which were contained in the old one, particularly one in which the federated employers reserved to themselves "the right to introduce into any federated workshop, at the option of the employer concerned, any condition of labor under which any members of the trade unions here represented were working at the commencement of the dispute." The feature of equality of standing is more prominent in the new agreement as the result of generally peaceable relations in the past nine years. The document is as follows:

1. GENERAL PRINCIPLES OF EMPLOYMENT.

The federated employers shall not interfere with the proper functions of the trade unions, and the trade unions shall not interfere with the employers in the management of their business.

2. EMPLOYMENT OF WORKMEN.

Every employer may belong to the federation, and every workman may belong to a trade union or not, as either of them may think fit.

Every employer may employ any man, and every workman may take employment with any employer, whether the workman or the employer belong or not to a trade union or to the federation respectively.

The trade unions recommend all their members not to object to work with nonunion workmen, and the federation recommend all their members not to object to employ union workmen on the ground that they are members of a trade union.

No workman shall be required, as a condition of employment, to make a declaration as to whether he belongs to a trade union or not.

3. PIECE WORK.

Employers and their workmen are entitled to work piece work, provided—

(*a.*) The prices to be paid shall be fixed by mutual arrangement between the employer and the workman or workmen who perform the work.

(*b.*) Each workman's day rate to be guaranteed irrespectively of his piece work earnings.

(*c.*) Overtime and night shift allowances to be paid in addition to piece work prices, on the same conditions as already prevail in each workshop for time work.

All balances and wages to be paid through the office.

4. OVERTIME.

The federation and the trades union are agreed that systematic overtime is to be deprecated as a method of production, and that when overtime is necessary the following is mutually recommended as a basis—viz.:

That no union workmen shall be required to work more than 32 hours' overtime in any four weeks after full shop hours have been worked, allowance being made for time lost through sickness, absence with leave or enforced idleness.

In the following cases overtime is not to be restricted:

Breakdown work, repairs, replacements or alterations for the employers or their customers.

Trial trips and repairs to ships.

Urgency and emergency.

5. RATING OF SKILLED WORKMEN.

Employers have the right to employ workmen at rates of wages mutually satisfactory to the employer and the workman or workmen concerned.

In fixing the rates of skilled workmen, the employer shall have regard to the rates prevailing in the district for fully trained and skilled men.

Unions, while disclaiming any right to interfere with the wages of workmen other than their own members, have the right in their collective capacity to arrange the rate of wages at which their members may accept work.

General alterations in the rates of wages in any district shall be negotiated between the employers' local association and the local representatives of the trade union or unions concerned.

6. APPRENTICES.

There shall be no recognized proportion of apprentices to journeymen, but it shall be open to the unions to bring forward for discussion the proportion of apprentices generally employed in the whole federated area.

An apprentice shall be afforded facilities for acquiring a practical knowledge of the branch of trade he adopts, and shall be encouraged to obtain a theoretical knowledge thereof as far as circumstances permit.

7. SELECTION OF OPERATIVES AND MANNING OF MACHINE TOOLS.

Employers have the right to select, train and employ those whom they consider best adapted to the various operations carried on in their workshops and to pay them according to their ability as workmen.

Employers, in view of the necessity of obtaining the most economical production, whether by skilled or unskilled workmen, have full discretion to appoint the men they consider suitable to work all their machine tools, and to determine the conditions under which they shall be worked.

The federation recommend their members that, when they are carrying out changes in their workshops which will result in displacement of labor, consideration should be given to the case of the workmen who may be displaced, with a view, if possible, of retaining their services on the work affected or finding other employment for them.

8. PROVISIONS FOR AVOIDING DISPUTES.

With a view to avoid disputes, deputations of workmen shall be received by their employers, by appointment, for mutual discussion of any question in the settlement of which both parties are directly concerned; or it shall be competent for an official of the trade union to approach the local secretary of the employers' association with regard to any such questions; or it shall be competent for either party to bring the question before a local conference to be held between the local association of employers and the local representatives of the trade unions.

In the event of either party desiring to raise any question, a local conference for this purpose may be arranged by application to the secretary of the employers' association, or of the trade union concerned, as the case may be.

Local conferences shall be held within 12 working days from the receipt of the application by the secretary of the employers' association or of the trade union or trade unions concerned.

Failing settlement at a local conference of any question brought before it, it shall be competent for either party to refer the matter to the Executive Board of the federation, and the central authority of the trade union or trade unions concerned.

Central conferences shall be held at the earliest date which can be conveniently arranged by the secretaries of the federation and of the trade union or trade unions concerned.

There shall be no stoppage of work, either of a partial or of a general character, but work shall proceed under the current conditions until the procedure provided for above has been carried through.

9. CONSTITUTION OF CONFERENCES.

An organizing delegate of the Amalgamated Society of Engineers shall be recognized as a local official entitled to take part in any local conference, but only in his own division. In case of sickness, his place shall be taken by a substitute appointed by the Executive Council.

Any member of the Executive Council or the general secretary of the Amalgamated Society of Engineers, may attend local conferences, provided that the member of the Executive Council shall attend only such conferences as are held within the division represented by him.

A member of the Executive Council, or the general secretary of the Steam Engine Makers' Society, and of the United Machine Workers' Association respectively, may attend any local conference in which the societies or either of them are directly concerned.

Central conferences shall be composed of members of the Executive Board of the federation, and members of the central authority of the trade union or trade unions concerned.

An employer who refuses to employ trade unionists will not be eligible to sit in conferences.

The National Association of Manufacturers.

The National Association of Manufacturers opened its twelfth annual meeting May 20, in the Astor Gallery of the Waldorf-Astoria, New York. The forenoon was taken up with the registration of arriving members. The preliminary session for organization was called to order by James W. Van Cleave of St. Louis, president, at 2.30 p. m. In his remarks the president stated that as already about 500 credentials of delegates had been received by the secretary he felt justified in predicting that this meeting will prove one of the largest and most influential in the history of the organization. The following were named on committees:

Credentials: D. H. Bates, chairman, Willcox & Gibbs Sewing Machine Company, New York; George R. Lombard, Lombard Iron Works & Supply Company, Augusta, Ga.; J. W. Raeder, Raeder Blank Book, Lithographing & Printing Company, Wilkes-Barre, Pa.; Elton A. Smith, H. B. Smith Machine Company, Smithville, N. J.; E. C. Speare, Cheney Bigelow Wire Works, Springfield, Mass.; Giles H. Stillwell, H. H. Franklin Mfg. Company, Syracuse, N. Y.

Rules and Order: J. A. Jeffrey, chairman, Jeffrey Mfg. Company, Columbus, Ohio; John A. Amory,, Gas Engine & Power Company and Chas. L. Seabury & Co., Morris Heights, N. Y.; Chas. Glover, Corbin Screw Corporation, New Britain, Conn.; M. H. Lane, Michigan Buggy Company, Kalamazoo, Mich.; William W. Lobdell, Lobdell Car Wheel Company, Wilmington, Del.; Edward V. McCaffrey, McCaffrey File Company, Philadelphia, Pa.; Franklin Murphy, Jr., Murphy Varnish Company, Newark, N. J.; Lewis W. Parker, Victor Mfg. Company, Greers, S. C.; F. A. Seiberling, Goodyear Tire & Rubber Company, Akron, Ohio; T. I. Stephenson, Knoxville Iron Company, Knoxville, Tenn.; T. L. Wainwright, Stonewall Cotton Mills, Stonewall, Miss.

Resolutions: F. C. Nunemacher, chairman, F. C. Nunemacher Press, Louisville, Ky.; Joseph D. Bascom, Broderick & Bascom Rope Company, St. Louis, Mo.; C. H. Harding, Erben-Harding Company, Philadelphia, Pa.; James A. Carr, American Seedling Machine Company, Springfield, Ohio; Thomas Devlin, Thomas Devlin Mfg. Company, Philadelphia, Pa.; H. K. Elston, Rochester Button Company, Rochester, N. Y.; Henry Fairbanks, E. & T. Fairbanks & Co., St. Johnsbury, Vt.; Ralph S. Hamilton, Hamilton & Hamilton, Jr., Providence, R. I.; J. R. Johnston, Johnston Glass Company, Hartford City, Ind.; James Kilbourne, Kilbourne & Jacobs Mfg. Company, Columbus, Ohio; S. M. Knox, New York Shipbuilding Company, Camden, N. J.; John Lindner, Lindner Shoe Company, Carlisle, Pa.; James R. MacColl, Lorraine Mfg. Company, Pawtucket, R. I.; H. E. Miles, Racine-Sattley Company, Racine, Wis.; E. C. Shaw, B. F. Goodrich Company, Akron, Ohio; C. H. Smith, Western Wheeled Scraper Company, Aurora, Ill.; Joseph Torrey, Torrey Roller Bushing Works, Bath, Maine.

The Treasurer's Report.

The treasurer, Francis H. Stillman of New York, called attention to improved methods of accounting introduced recently into the bookkeeping. He noted an increase of both income and bank balance, and especially the thrifty condition of the translation and publication departments. The cash account showed the following:

Cash balance April 1, 1906	$18,958.20
Receipts to March 31, 1907	167,031.53
Total	$185,989.73
Expenditures on approved vouchers to March 31, 1907	161,276.72
Balance on hand April 1, 1907	$24,713.01

The following was submitted as a correct balance sheet of the assets and liabilities of the association at the close of the association's fiscal year, March 31, 1907.

Assets.

Cash in bank	$24,713.01
Accounts receivable	24,109.53
Furniture and fixtures	2,808.31
Total	$51,630.85

Liabilities.

Accounts payable	$1,498.11
Working capital	50,132.74
Total	$51,630.85

The Secretary's Report.

The report of the secretary, Marshall Cushing of New York, covered much ground, rehearsing facts, interesting especially to the association and connected with the past as well as the more recent events of its existence. He noted the successful work done by the association against lobbyists and so-called labor leaders in their attempt to throttle the vital open shop principle and in other ways to sacrifice industrial liberation for selfish ends. The failure of so-called "organized labor" in politics was ascribed in no small degree to the light let in upon it by the association's efforts and figures. On this point he said:

> I wish to make it unmistakable and sincere that it has been the members of the association with their personal sense of justice and their knowledge of good economics and good business, with their influence as individuals, with their organizaton, yes, with their well disciplined and often repeated efforts to convince public men by word of mouth, or by letter, or telegram, or by all three, whenever occasion required, that have done this; and I wish equally to place in this more or less permanent record a statement of the success of the open shop movement, which can hardly be made too strong, giving full credit to the educational influence, the individual and collective pressure for what has been right morally and correct economically, which the various national organizations of employers and the various local employers' associations and citizens' alliances of the country have put forth.
>
> Success in beating back the almost overwhelming tide of coercive socialism, as expressed in labor bills backed up by political blackmail, may have been possible without them; nobody can tell. I know it is the great good fortune of the country, perhaps the greatest possible good fortune of the country, that they, supporting the National Association, happened to exist for this clean and patriotic purpose, and that the National Association, no matter for what it had existed previously, or exists for now, or may exist for in the future, applied its power to the temporary settlement, at least, of that same vital open shop question.

The public service rendered by the association, both by its vigilance and its activities, he said, is beyond computation. In the matter of the association's resistance of the metric system as a subject for compulsory legislation, the secretary saw an especially worthy performance. The business facilities in the way of bureaus, index conveniences and information on foreign trade data, otherwise difficult to obtain, but supplied on demand by the association, were recognized in the report. The freight bureau, illustrating the value of co-operation; the enlarged 25-page *American Industries*, the especial publication of the association; the "American Trade Index," the official directory of the association, and the domestic business facilities offered by the association were all called to general attention.

Dr. Neill on Child Labor.

The first speaker at Tuesday morning's session was Dr. Charles P. Neill of the Department of Commerce and Labor, whose topic was "Certain Aspects of the Child Labor Problem." He said he had not been able to prepare a formal address. Regarding the investigation now in progress he said:

> The impression seems to prevail in certain quarters that this investigation has been arranged to bolster up certain preconceived ideas. That impression is erroneous. Our sole aim is to learn the facts, and no effort will be made to present harrowing details for sensational purposes. I wish to say, also, that I have not the slightest doubt that the members of this association are just as anxious to prevent abuses in the matter of child labor as anybody, and I appeal to you for hearty co-operation.

President James W. Van Cleave delivered his annual address, which covered a wide range of subjects, an abstract of which is as follows:

President Van Cleave's Address.

He first reviewed such legislation of the last Congress as affects manufacturing interests, and discussed economic and industrial questions which confront the manufacturing world. Regarding the question of exclusion of Asiatic labor, he said that while in a general way he was in sympathy with the idea, he was in favor of the employment of Chinese or Japanese labor on certain works, such as railroad construction and the Panama Canal, where white labor could not be obtained in sufficient numbers.

Alluding to the proposed Federal incorporation law, he said that its absence was often a serious setback to business, as it gave room for obstruction by careless or hostile Legislatures. "Every company doing an interstate business of any kind should be granted a Federal charter, and thus have the same freedom from invidious State laws that the trunk line railroads enjoy under the Interstate Commerce act."

Taking up the Pure Food law, he said that in order to become thoroughly effective it should be supplemented by State legislation. "In these days, however, when hysteria and fanaticism are running amuck through the

country, and in many cases registering themselves in the statutes, there is an especial reason for public spirited, level headed men to use their influence to check these tendencies. On the food, as well as on every other question, what the people want is sane legislation. We want laws to regulate and not to destroy industries."

The speaker made a general reference to the forthcoming Hague Conference, and, while applauding its purposes, he declared that "industrial wars, due to the blindness of the bosses of some of the labor unions, are a much greater menace to the United States to-day than foreign wars."

THE TARIFF QUESTION.

Regarding the question of tariff revision, he said that, although there was an honest division of opinion in the association, he thought "some of the duties ought to stand as they are, others ought to be lowered, and some should be raised. No, I am not going to say off-hand what duties are too high or what are too low. This is a matter which should be determined after a careful study of all the schedules and of all the trade conditions, taking the entire business field into view."

He favored a declaration by the Republican party at the coming convention in favor of tariff revision at an extra session to be called immediately after March 4, 1909, and the appointment by the President of a non-partisan commission, with Congressional authorization, to frame a report on which such revision should be based. "In this way we could get a tariff which business, and not the log rolling of the politicians or the clamor of the demagogues, would frame."

He declared that much folly had been written and spoken on the problem of child and woman labor in this country.

"For much of this child labor the greedy, shiftless, selfish parents are as responsible as are the employers. Rightly conducted, and so long as it does not interfere with their proper education, work benefits children, as it does adults. I favor the employment of children of the proper age, and under proper sanitary conditions. The latter restriction I would apply also to the employment of women."

In view of the gradual abolishment of the apprentice system, the speaker approved the extension of industrial education as imperative for the maintenance of the country's industrial position. On the general question of the "labor problem," he urged adherence to the previously announced principles of the association:

"The open shop. No boycott. No limitation in the number of apprentices. No limitation in the output. No dictation by the labor unions as to the manner in which employers shall manage their business."

"The newer issues," he said—"those which are caused by a determination of some of the labor union leaders to terrorize President, Congress, judges and juries, and make the labor societies a favored order in the community—we must combat by educating employers and people in the principles of good citizenship, and by a closer co-operation among the various societies of employers."

After his formal address Mr. Van Cleave made some remarks on the finances of the association. He said he believed that the next president of the association ought to have much greater resources to carry on the work of the association. He added: "It is time to do something. We want to federate the manufacturers of this country to fight industrial oppression. It does not seem proper that 3000 manufacturers should elect a man to the office of president and then not provide him with the means for doing the work that he is expected to do. The president ought to have fully $500,000 a year for the next three years. I am going to name a committee, and I am going to ask the members of that committee to meet me to-night, and consider ways and means to raise the sum I have mentioned." The president appointed a Committee on Ways and Means for the purpose of raising this sum and providing for the work. The following members comprise the committee:

C. W. Asbury, Pennsylvania; J. G. Battelle, Ohio; G. T. Coppins, Massachusetts; H. S. Chamberlain, Tennessee; A. E. Cox, Massachusetts; M. Cushing, New York; E. Durand, Illinois; I. W. Frank, Pennsylvania; C. C. Hanch, Indiana; T. R. Hazard, Rhode Island; J. A. Hill, New York; R. C. Jenkinson, New Jersey; J. Kirby, Jr., Ohio; T. S. Laughlin, Maine; H. B. Lupton, Pennsylvania; W. McCarroll, New York; E. D. Metcalf, New York; H. E. Miles, Wisconsin; L. Nissen, New York; F. C. Nunemacher, Kentucky; D. M. Parry, Indiana; J. E. Patterson, Pennsylvania; C. W. Post, Michigan; D. C. Ripley, Pennsylvania; W. B. Roper, Virginia; C. A. Schieren, New York; B. T. Skinner, Michigan; H. E. Slayton, New Hampshire; C. H. Smith, Illinois; E. A. Smith, South Carolina; F. H. Stillman, New York; V. B. Taggart, New York; W. E. Tallmadge, Wisconsin; D. A. Tompkins, North Carolina; R. Young, New York; J. W. Van Cleave, Missouri.

A Nominating Committee composed of the following members was then appointed:

S. O. Bigney, Massachusetts; T. D. Reynolds, Ohio; E. Durand, Illinois; D. M. Parry, Indiana; H. Heide, New York; A. B. Farquhar, Pennsylvania; J. Kirby, Jr., Ohio; F. A. Walker, Connecticut; D. A. Tompkins, North Carolina; Thos. Hunter, New York; W. A. Viall, Rhode Island; G. T. Coppins, Massachusetts; J. F. Taylor, Ohio; F. A. Burr, Alabama; W. R. Farrand, Michigan; Jas. Kilbourne, Ohio; F. C. Nunemacher, Kentucky; W. N. Kelly, California.

Next on the programme was the address by Charles M. Pepper, special agent of the Department of Commerce and Labor, to investigate trade conditions in foreign countries. Mr. Pepper's subject was "Foreign Trade: How to Get It and Keep It."

Committee Reports.

The Committee on Interstate Commerce, A. B. Farquhar, chairman, submitted a particularly conservative report on the current railroad agitation.

The report on Industrial Education, by the committee, of which Anthony Ditner of St. Louis is chairman, was combined with that of Arthur D. Dean of Boston. The work of the Ditner Committee has been purely educational and missionary. It has kept in close touch with every effort and movement throughout the country of which it could learn, looking to the establishment of purely industrial trade schools, the purpose of which is to produce finished workmen and send them forth to take their places in the skilled industries of the country.

Jackson Johnson of St. Louis, chairman of the Bankruptcy Committee, submitted the committee's report, making the following recommendations:

That the National Association of Manufacturers place itself on record through proper resolutions:

First, as favoring permanent national bankruptcy laws;

Second, as favoring such amendments to these laws from time to time as will eliminate fraud and dishonesty in bankruptcy matters and assure a square deal to both creditor and debtor; and

Third, that this convention instructs its officers to co-operate actively with other organizations in every movement toward the ends outlined.

D. A. Tompkins of Charlotte, N. C., chairman of the Committee on Labor Immigration, reported for his committee. He said:

It would seem to your committee to be desirable that representatives of all the elements interested in this subject of immigration should be gotten together, and that an immigration bill should be formulated which would eliminate at least most of the ambiguities of the present law, and it should provide for a less partisan execution of the law than has been practiced in the last five years.

D. A. Tompkins, chairman of the Committee on Merchant Marine, said his committee still recommended the original bill formulated by the majority of the Merchant Marine Commission after a careful investigation by that body of the condition of American shipping and of the needs, for purposes of commerce and war, of American shipping.

Testimonial to Ex-President Parry.

In the afternoon a testimonial in bronze was presented to D. H. Parry, former president of the association. The testimonial consists of a resolution of appreciation passed by the convention last year, with instruction that it should be put in some form in which it might be kept as a memorial. The committee having the matter in charge had a bronze tablet made containing the resolutions, and this was presented to the former president.

After briefly expressing his thanks Mr. Parry made a speech on "Individualism," and was followed by Hon. Francis B. Loomis, former Assistant Secretary of State, on the subject, "Some Practical Results of Consular Reform Agitation."

F. C. Nunemacher of Louisville, in an address on "Employers in Politics," made a plea for that better sort of participation in politics which evolves statecraft, and which protects the community from the dangers of inactivity on the part of its intelligent and progressive elements. Otherwise the drifting toward the rocks of anarchy and revolution will continue. He predicted that the next campaign would not be one of political parties so much as a struggle of Americanism against anarchism, with the issue the strict enforcement of the laws. It met with great applause, and a motion to print it and send it to the President and all the members of Congress prevailed.

The proceedings of Wednesday will receive attention in our next issue.

Canadian Industrial Notes.

TORONTO, May 20, 1907.—Application has been made by Mackenzie & Mann to the City Council of Toronto for a site in the vicinity of Ashbridge's Bay for a blast furnace. It is stated that the plans contemplate a much larger undertaking than the mere building of a furnace. It is estimated that for the iron and steel works projected a site of 1000 acres will be required. The city is not yet prepared to give an answer, for the reason that a scheme for the reclamation of the bay has not yet been decided upon.

The Deseronto Iron Works has started up after a prolonged shutdown. Hard wood limits secured in the northern part of Hastings County insure an adequate supply of charcoal for smelting purposes.

Supplementary letters patent have been granted for increasing the capital stock of the Niagara Iron & Steel Company, lately incorporated, from $1,000,000 to $2,000,000.

It is estimated that the value of the mining machinery received in Cobalt within the first four months of the current year is $200,000. Machine shops are in arrears with their orders for mining outfit for that camp, and there is a movement to establish manufacturing works in Cobalt itself.

A number of St. Thomas men have joined together in a company for the manufacture of freight cars in that city. Capital is to be $400,000. It is said that the company can obtain a contract that will keep it busy for ten years.

E. A. Wallberg, who is building the Intercolonial Railway shops, is negotiating with the city of Moncton, N. B., for terms for the erection of car works there. The Board of Trade is supporting his project and has passed a resolution in favor of exempting the property from taxation for 20 years.

Many Canadian shops are at work upon the Canadian Northern Railway Company's large equipment orders, calling for a total outlay of more than $5,000,000. With the exception of the dining and sleeping cars, all this business goes to Canadian works. C. A. C. J.

The American Rolling Mill Company, Middletown, Ohio, recently made a demonstration of its truss method of partition construction in a building in Knoxville, Tenn. The truss lath is a sheet of metal perforated in such a manner that it becomes about an inch thick, and forms a perfect key for the plaster, at the same time being a strong reinforcing element. At the building where the demonstration was made it was wired to a temporary studding, and two coats of plaster applied to the side opposite the studding. When the plaster hardened on the side the studding was removed, and the plaster applied to the other side of the lath, the whole forming a 2-in. solid partition containing no steel studding, angle iron or stiffening rods and being strong and rigid. The partition thus formed is not only a space economizer, but is fireproof and economical in construction. This method of partition construction has been accepted by the Department of Buildings of New York. Nickerson & Boyd represent the American Rolling Mill Company in Knoxville.

Dominion Iron and Steel Operations.

TORONTO, May 20, 1907.—On May 16 the output of the Dominion Iron & Steel Company's blast furnaces was 899 gross tons. The new Bessemer converters are reported to be fully up to expectations, working without a hitch. One of them is operated during the day and the other during the night. It is calculated that they will add 50 per cent. to the company's steel manufacturing capacity, raising the steel output to 30,000 tons per month. Until the converters were installed the company's steel plant was not of the magnitude it should be to balance the company's blast furnaces with its rolling mills. The blast furnaces could produce a larger output of pig iron than the open hearth steel furnaces could take care of, and the rolling mills could use more steel than the open hearth furnaces yielded. The consequence was a falling behind on the company's rail orders. About 25,000 tons of rails are yet due on the Canadian Pacific Railway Company's 38,000-ton order. The rail mill is now at work on the remainder. The rails for the sections of the Government division of the National Transcontinental Railway have not all been rolled, and the tonnage of these yet to be delivered will keep the mill in business for some time.

Bounty Claims.

The company's claims for Dominion bounties earned in the month of January, February, March and April have now been filed. They call for a total payment of almost $400,000. Delay in the submitting of claims on bounty account was this year incidental to the slow progress of new legislation on the subject. Mr. Fielding's bill for the continuance of the bounties was introduced in November, but did not become law until the latter days of the session, which came to an end late in April. Until the new measure became law the Government's only authority for the paying of bounties during the first half of the present year was the act of October 24, 1903. Under that statutory amendment the bounties were scaled down for the year ending June 30 next to 35 per cent. of their original rate. This means that during the twelve-month in question Canadian pig iron made from imported ore would be entitled to a bounty of 70 cents a ton and Canadian steel would be entitled to a bounty of $1.05 a ton. But the legislation of last session provided that from January 1 last the bounty on Canadian pig iron made from imported ore should be $1.10 per ton and on Canadian steel $2.10 per ton. It can be seen, therefore, that claimants for bounty earned in the first months of the present year could afford to defer their applications until the new law was securely fixed on the statute book.

A Provincial Bonus.

A public aid to the production of iron and steel often lost sight of is that given in Nova Scotia in the form of a bonus on each ton of coal consumed in the manufacture of iron and steel in that province. The report of the Nova Scotia Department of Mines, just issued for the year ending September 30 last, presents the following statement of payments on this account:

Oct. 17, 1905. Dominion Iron & Steel Co., 6¼c.	$8,399.50
Jan. 19, 1906. Dominion Iron & Steel Co., 6¼c.	9,429.75
Feb. 14, 1906. Londonderry Iron & Mining Co., 5c.	7,054.40
Feb. 15, 1906. Nova Scotia Steel & Coal Co., 5c.	7,109.25
April 10, 1906. Londonderry Iron & Mining Co., 5c.	1,323.50
April 17, 1906. Dominion Iron & Steel Co., 6¼c.	11,744.37
May 7, 1906. Nova Scotia Steel & Coal Co., 5c.	2,748.05
May 15, 1906. Londonderry Iron & Mining Co., 5c.	1,377.65
July 25, 1906. Dominion Iron & Steel Co., 6¼c.	11,773.75
Aug. 15, 1906. Londonderry Iron & Mining Co., 5c.	1,140.20
Aug. 6, 1906. Nova Scotia Steel & Coal Co., 5c.	2,944.15
Total.	$64,954.57

This bonus is in reality an abatement of the royalty on coal, such of that fuel as is applied to other uses than the manufacture of iron and steel being subject to the regular royalty of 12½ cents per ton, whereas coal used in the making of iron and steel is subject to not more than one-half of this rate. C. A. C. J.

Moorhead, Brother & Co., Incorporated, Pittsburgh, are remodeling a portion of their plate and skelp mills at Sharpsburg, Pa. A traveling crane will be installed.

OBITUARY.

O. W. POTTER.

Orrin W. Potter, who was for many years very prominent in the Western iron and steel trade, died at his residence in Chicago May 17. He was born in Rochester, New York, December 25, 1836. Possessed of indomitable enterprise and a determination to make the best of all opportunities, he applied himself diligently and secured more than an ordinary education by self instruction. In 1856 he went West and first found employment at the iron works in Wyandotte, a suburb of Detroit, Mich., under Capt. E. B. Ward. The building of a rolling mill in Chicago, to roll iron rails, was undertaken in the following year by Capt. Ward and his associates, and Mr. Potter was transferred to it in the capacity of bookkeeper and paymaster, and upon a reorganization in 1864, when the North Chicago Rolling Mill Company was created, he became secretary and general manager. It was at the North Chicago Works and under Mr. Potter's superintendence that the first Bessemer steel rail was rolled in the United States. This was done May 24, 1865, and the ingot came from the experimental steel works at Wyandotte.

In 1871 Mr. Potter became president of the North Chicago Rolling Mill Company. On May 4, 1889, that company, the Union Steel Company and the Joliet Steel Company were consolidated under the name of the Illinois Steel Company, and these three rail-making companies, which had been actively competing with one another for the rail business of the Northwest, thus united their interests under one management. On the organization of this company Mr. Potter was elected chairman of the Board of Directors and of the Executive Committee. He held this position until April 1, 1890, when he retired. Subsequently, for a number of years, he was vice-president of the Commercial National Bank, Chicago. He was also heavily interested in other important commercial and manufacturing enterprises in the West, among them the Metropolitan Iron & Land Company of Ironwood, Mich., owner of the famous Norrie mine. He leaves a widow, three daughters and one son, E. C. Potter, who was also for a number of years prominently indentified with the North Chicago Rolling Mill Company and the Illinois Steel Company.

EDWARD BUTLER DUNBAR, of the firm of Dunbar Bros., spring manufacturers, Bristol, Conn., died May 9, aged 64 years. He was a native of Bristol, was educated at Williston Seminary, Easthampton, Mass., and began his business career in the New York office of Dunbar & Barnes, manufacturers of hoopskirts, Bristol. In 1862 he became manager of the New York office, and continued there until the decline of the hoop skirt business. With his brother, Winthrop W. Dunbar, he formed a partnership for the manufacture of springs, continuing a business founded by his father, which has grown to substantial proportions under the management of the brothers. Mr. Dunbar was prominent in the affairs of his town, serving in both branches of the State legislature, as president of the Bristol National Bank and president of the Bristol Board of Trade. He was a member of the Bristol Club and of Reliance Council of the Royal Arcanum, and for four years was president of the local Y. M. C. A. He leaves a widow, a son and a daughter. His brother and partner, Winthrop W. Dunbar, survives him.

FREDERICK G. SMITH, treasurer of the Vulcan Iron Works, Wilkes-Barre, Pa., died May 11, aged 68 years. He was a native of Germany, came to this country in 1861 and enlisted in the Union army, returning to Wilkes-Barre at the close of the war, taking employment as a machinist in the works of which he afterward became an officer. He leaves a widow and two sons. His son Frederick is the purchasing agent of the company.

SIR BENJAMIN BAKER, born in 1840, and one of the great engineers of the world, died May 19, at his home in England. He invented the pneumatic shield, which has rendered so much assistance in tunneling under rivers. The two engineering works by which he will be best remembered are the Forth Bridge in Scotland and the Assouan Dam in Egypt.

FRANK B. COTTON, assistant treasurer of the American Tube Works, Boston, died May 12, aged 57 years. He was prominently identified with banking interests, as well as with the tube works.

EDMUND P. LORD, general manager of the plant of the H. K. Porter Company, Pittsburgh, builder of light locomotives, died May 12, as the result of an accident while starting for a horseback ride. He was born near Boston, Mass., June 16, 1860, was graduated by Yale University in 1881, and afterward by the Stevens Institute of Technology. He then entered the employ of the Pennsylvania Railroad, and was successively located at Renovo, Pa., Altoona and Fort Wayne, Ind., at the latter place as assistant superintendent of motive power of the Pennsylvania lines West. In 1892 he became superintendent of motive power of the Big Four Railroad. After remaining in that position for a year he went to Pittsburgh as superintendent of the H. K. Porter Locomotive Works, remaining with that company ever since, at the time of his death having the title of general manager. He is survived by his widow, one son and one daughter.

Ashtabula Ore Dock Improvements.—Extensive improvements designed to facilitate the handling of ore, which were commenced at Ashtabula by the Pennsylvania Railroad about two years ago, are rapidly nearing completion. The work includes the building of two new docks, each 740 x 1120 ft., of concrete set on cribbing; the widening of the channel of the river 60 ft. to admit the largest lake steamers; the installation of six new ore unloading machines which will more than double the lines' former capacity; the erection of an ore handling bridge 550 ft. long, with a traveling space of 800 ft. up and down the dock; two new car dumpers for handling coal; a breakwater 1200 ft. long, and a power plant. The ore handling bridge has a center span of 250 ft., and two cantilever spans of 150 ft. each. The ore handling machines are equipped with 6-ton buckets, which will make a round trip between the vessel and car in 50 seconds, giving each bucket a capacity of 430 tons an hour. One of the new dumpers for coal cars is already in operation. Each will have a capacity of 25 cars an hour. The total cost of the improvements will amount to about $3,000,000.

The melting point of tantalum is said to be between 2250 and 2300 degrees C. Its resistance increases with rise of temperature just as in the case of osmium. At ordinary temperatures the resistance of a wire 1 m. long and 1 sq. mm. in section is 0.165 ohm. At the temperature of the incandescent lamp this figure becomes 0.85 ohm. The breaking strength of tantalum, when cold, is very great, being 93 kg. per square millimeter, as compared with from 70 to 80 kg. for good steel. When heated, however, it becomes soft like osmium, and a filament after burning for some time is easily broken. The material is for incandescent filaments, the diameter being from 0.035 to 0.05 mm. With the larger diameter a 25 candle power lamp for 110 volts requires a filament 650 mm. (26 in.) long and weighing 0.022 g., so that one kilogram of tantalum would make 45,000 lamps (20,000 per pound).

The McKeesport Tin Plate Company, McKeesport, Pa., which now has a plant containing 10 hot mills, will add eight more, making a total of 18 and giving this company the largest independent tin plate plant in the country. The hot and cold mill building will be extended 200 ft., 1200-hp. boilers will be added, and also a 500-kw. generator. Contracts for these mills and the other equipment will be placed in a short time.

The charter of the Davis Pressed Steel Company, Wilmington, Del., expired by limitation on May 1, and it has been succeeded by the Davis Solid Truss Brake Beam Company, organized under the laws of Delaware. Nathan H. Davis is president; Thomas C. Davis, vice-president and treasurer, and C. Theodore Buchholz, secretary. Business will be continued at the present location.

THE AMERICAN FOUNDRYMEN'S ASSOCIATION.

Eleventh Annual Convention at Philadelphia, May 21.

After 11 years the American Foundrymen's Association went back to Philadelphia, its birthplace, for its convention of 1907. The meeting from which the association resulted was held at the Franklin Institute, Philadelphia, in June, 1896, and was attended by about 400 representatives of the foundry interests of the country. The convention of 1907, which began on Tuesday, May 21, was held in the assembly room of the Second Regiment Armory, on Broad street, below Susquehanna avenue. The armory is about 3 miles from the City Hall and from the Bellevue-Stratford Hotel, which is the social headquarters for the meeting, but the exhibits of foundry appliances, which have now become so marked a feature of these conventions, could not be accommodated in any of the ordinary convention halls in the business section of the city.

The Foundry Equipment Exhibition.

This exhibit, which has taken on the proportions of a local industrial exposition, is in itself a striking object lesson in the foundry progress that has marked the past 11 years in the United States. Last year at Cleveland, in what was considered a remarkable showing of the appliances and equipment of the modern foundry, 40 firms were represented. This week's exhibition at Philadelphia has exhibits from no less than 70 firms. On Monday the various forms of machinery were set in motion, and from 9.30 a.m. until 10.30 p.m. on all the days following to and including Friday, were open for the inspection of visitors. The molding machines were a particular feature of interest, and foundry proprietors, superintendents and foremen had an opportunity to see competitive demonstrations in a way possible under no other circumstances. To one who attended the meeting of 1896 the development into the conditions of the present convention is simply amazing.

An added element of interest in this year's convention was the coming to Philadelphia of representatives of the brass founding industry, with the expectation of forming an organization kindred to that of the gray iron interests.

A Large Convention.

Up to Tuesday evening more than 1100 persons had registered at the armory headquarters, and the indications then were that the crowd would reach the proportions of the record breaking one at Cleveland last year.

President W. H. McFadden of Mackintosh, Hemphill & Co., Pittsburgh, called the first session to order at 11 o'clock Tuesday morning, with nearly every seat occupied, many ladies being in attendance. Mayor John E. Reyburn of Philadelphia spoke pleasant words of welcome, and told how his convention experiences of recent months had amounted to a really liberal education. Thomas Devlin, president of the Philadelphia Foundrymen's Association, made the welcome more binding, and incidentally dipped into a chapter of foundry association history, going back to November 4, 1891, when the Philadelphia organization, the pioneer in the educational movement, was started. He hinted that the visitors might conclude after their three days' stay that Philadelphia is not such a slow town, after all. Dr. Elmer E. Brown, chairman of the Philadelphia Entertainment Committee, followed Mr. Devlin, and Secretary Richard Moldenke read a message of greeting from President W. H. Bense of the New England Foundrymen's Association.

The responses were by President McFadden and by President S. T. Johnston of the Foundry Supply Association.

Geo. C. Davis of the Philadelphia committee made explicit announcement of the trips planned to various Philadelphia foundries.

President's Address.

President McFadden, in an address that evoked enthusiastic appreciation, went more thoroughly into the work of the association and the possibilities of its future than has been done on any similar occasion. He considered that marked progress in the American foundry practically began with the organization of the association in Philadelphia 11 years ago. Foundry metallurgy was one of the earliest lines of effort, and the effects of silicon upon cast iron absorbed attention at first. It was soon found that other elements had an important bearing upon the properties of the casting and their study has developed foundry metallurgy into a science. The surprise is that the opportunities afforded by metallurgy are not more generally taken advantage of by foundrymen.

THE ASSOCIATION'S WORK IN ANALYSIS AND TESTING.

Referring to the initiative of the association in preparing and distributing standardized drillings for the analysis of iron, the speaker spoke also of the work of the committee on standard methods for analysis of iron. "Started some years ago, the work has since been in the hands of our metallurgists. After four years of hard and painstaking labor their committee has at last succeeded in placing before our association a series of standard methods. Their adoption, for use in cases of dispute, will greatly aid in preventing dissension between the buyers and sellers of pig iron. The secretary and the committee have worked arduously for the association and deserve great credit for their results.

"The work of this association formed the basis for the standard methods for testing cast iron adopted by the American Society for Testing Materials. The data published in connection with this work, in our proceedings, is of itself an encyclopedia on cast iron, giving the analysis as well as the strength of a large number of characteristic irons. It is to be regretted that these specifications have not been more generally used. It is possible that they do not fulfill the requirements of founders; if this is so steps should be taken to remedy the defects. Cast iron will maintain its position in the future solely by the intelligent application of some method of testing which will give the engineer an accurate knowledge of its strength in the casting, as it makes up a component part of the machine.

"The work of the association in bringing about the adoption of standard specifications for buying pig iron deserves mention. The old method of buying by fracture is rapidly disappearing and the modern method of buying by analysis is rapidly taking its place, much to the advantage of both the buyer and the seller."

The importance of better methods of foundry cost keeping was urged upon the membership, and the association was asked to assist in developing a simple system giving accurate costs. "Some method should be adopted for properly distributing the general expense or burden of a plant so as to enable the foundryman to ascertain just what class of work is profitable for him to make and what should be left for some other to handle. An intelligent system would lead to a rearrangement in bidding on work, which would cause a much improved condition in our jobbing foundries."

AFFILIATED ASSOCIATIONS.

In speaking of organizations affiliated with the American Foundrymen's Association the president referred first to the Associated Foundry Foremen, whose growth has rivaled that of the association itself. The foremen's meetings have produced a very considerable amount of valuable literature and the organization has done much to improve foundry conditions.

The Foundry Supply Association, organized one year ago, the speaker considered would be of benefit both to the foundrymen and the supply firms, particularly through the exhibit of foundry appliances held at each convention under the auspices of the new association. The opinion was expressed that the molding machine, which is a prominent feature in these exhibits, is in its infancy as an adjunct to the foundry, much as has already been accomplished.

A welcome was extended to the brass founders, who

are attending the present convention for the purpose of forming an allied association.

FOUNDRY EDUCATION.

The speaker urged that the American Foundrymen's Association be in the forefront of the educational movement now so important a factor in the foundry world. Specific co-operation has already been given through the association's Committee on Technical Schools, also through the five instruction papers already published by the association, with more in preparation. These papers are elementary and are intended to give general instruction in different branches of foundry practice. In advocating a more active part by the association in shaping the foundry educational movement the speaker said:

"The classes to be educated are technical men for superintendents, engineers, metallurgists and chemists, and industrial men for foremen, molders, apprentices and handy men. Three different schools, or courses, would be necessary. Our technical schools should equip themselves to teach the first class mentioned. It is obvious that they are not at present fitted to do so. It is the duty of the members of this association, both as an association and as individuals, to so exert their influence that technical schools will give more attention to this important branch of industry. In order to accomplish anything of value, the technical institutes should be urged to provide instruction by scientifically educated men who have had practical foundry experience. Courses and equipment should be supplied to give a practical as well as a theoretical foundry training; such instruction should develop men who in a short time would be able to work into foundry superintendents and engineers.

"The education of foremen, molders and apprentices presents a different problem. In localities where trade schools with night courses exist the problem is simplified. The trade school should teach such branches as would aid the foreman to become more proficient, the molder to be a better molder and fit to assume the position of a foreman and the apprentice to master his trade.

"The third school should educate handy men and enable those who have been unable to learn a trade to improve their condition. Such schools are being maintained by other organizations and do not come entirely under the scope of this association. The subject is, however, a vital one to foundrymen and the scarcity of competent molders, together with the disposition in some quarters to restrict the number of apprentices, make it one which may well be borne in mind."

FUTURE POLICY.

Other lines of activity which the association might well follow in the future were pointed out. Referring to the recent paper before the Pittsburgh Foundrymen's Association by A. E. Outerbridge, Jr., of Philadelphia, on "Fluxes and Alloys," the president suggested that since it is not possible for the average foundryman to separate the chaff from the wheat it might be well for the association to have these materials investigated for the benefit of its members. A permanent department for investigating the problems continually arising in the foundry industry was advocated. Possibly it could be installed in co-operation with one of the technical schools. Sands, fluxes, alloys, core compounds and blackings could be studied and tested for the benefit of manufacturer and consumer. The foundrymen could well afford to maintain such a department, since it would soon be shown that many of the materials bought by foundries are carrying much more than a legitimate profit.

Finding soon after taking office that the association was hampered by lack of funds and that its income was dependent upon the dues of members President McFadden devoted much effort to increasing the membership. As a result of this campaign about 150 new members have been acquired in the past year. This, however, does not make the income of the association sufficient to enlarge its work. It was recommended, therefore, that the dues, which at the New York meeting in 1905 were reduced from $10 to $5, in the hope of largely increasing the membership, be now restored to the original figure. There has been much inquiry in the past year about the journal formerly published by the association. If the dues were increased to $10 the speaker believed that the publication of the journal could be resumed. "It is very easy to assent to the request of your president, vote for a journal, and then go home and think no more about it until next year. Our secretary would need the support of every member were he again to publish a regular organ. The entire life of this association should not be bound up in one annual meeting. The members should be kept in touch with one another by a progressive journal. There is more interest in our work than ever before and the time is ripe for a movement which will bring a majority of the foundrymen of the country into the ranks of this association."

In conclusion, the president made generous acknowledgment of the efforts of Secretary Moldenke, the Philadelphia foundrymen and the Foundry Supply Association, in behalf of the present convention.

Report of the Secretary-Treasurer.

The secretary, Dr. Richard Moldenke, who is also the association's treasurer, made the most gratifying report presented in the association's history. We make the following extracts:

Thanks to the well directed efforts of our president, Mr. McFadden, the membership of our association has grown in the past year fully 75 per cent. Our vice-presidents and Mr. Lane of the Foundry Supply Association, have also assisted your secretary materially in bringing up the membership, so that to-day we are 532 strong. The financial situation of the association is also an excellent one. The income for dues, sales, &c., has been $2847.45. The expenses were as follows:

Transactions	$303.41
Salaries	1,200.00
Printing	198.35
Postage	383.00
Sundries	8.75

This leaves a balance of $753.94 in the treasury. While the balance looks large, most of it is on account of dues paid in advance for the coming year by the new members just received. The result is, nevertheless, highly gratifying and augurs well for the future of our work.

The year has been a remarkable one. Everybody has been busy and probably little time has been given to experimenting and research. Nevertheless, your secretary's office has been a bureau of information of very widespread influence, and has doubtless saved many dollars for the foundrymen who have taken advantage of its existence. Hardly a week passes without several inquiries from people desirous of embarking in the business of making castings. The answer is "Don't," most of the time, which advice if followed saves much heartache for those who would suffer from misdirected competition. No one can complain of legitimate competition when based on a thorough understanding of costs, but a plunge on the part of one unacquainted with the pitfalls of making castings often leaves a trail of ruin in the territory which he affects.

The success of the exhibition of foundry machines and appliances shown at Cleveland has stimulated everybody to such an extent that I know of parties here now who came for the purpose of purchasing their equipment after studying the various types offered. Perhaps in no industry are mechanical appliances wanted more badly than in the foundry, and with the enterprise shown by our supply men in placing their best and all before us at one place and time, I predict that this feature of our convention will do more lasting good for the trade than anything else we can offer.

I would continue to urge foundrymen to join the association. The complaint is heard everywhere that there are too many associations to belong to. This is true in a sense. So far as we are concerned, let the foundrymen take out a membership and delegate their foundry superintendents, foremen, pattern foremen, metallurgists and chief accountants to keep track of the work done, and call it not an expense, but an investment. Owners write me hundreds of letters, asking for financial information, costs, estimates, &c. Your secretary makes it a rule to answer every one as fully as may be. He is inclined to draw the line on nonmembers when the correspondence gets over five-page letters and not even "thank you" to follow, but can truthfully state that no foundry foreman has ever proved ungrateful for advice and help given from our office, while this cannot always be said of their employers.

The Government tests of coke for foundry purposes have been continued in the past year and Congress has appropriated further funds, some of which are to be used for the study of the cupola. I would ask this association to authorize a committee from its membership to aid in this work with their advice and co-operation.

There will be formed an association of brass founders and allied interests at this convention, if those who come for this purpose so decide. We wish this movement every success.

Our better financial situation will enable us to continue the publication of our instruction papers. The one recently issued brought such a flood of letters and orders for the preceding numbers that I feel justified in recommending the broadening out of this work as much as possible. Our Mr. Field, who looks after the metallurgical part of this work, and our Mr. West, for the molding, have consented to continue the good work. We hope further to do something for the patternmaker and coremaker, so that a firm by placing these short, easily read papers in the hands of their intelligent young men, will find direct improvement resulting. The foreman, of course, will be the man to go over the information with the men, and we know that our modern foremen are only too glad to help in this work.

Reports of Committees.

For H. E. Diller, chairman of the committee on Standard Methods for the Analysis of Iron, Secretary Moldenke presented a report, adding to the methods presented in 1905 and 1906 for the determination of silicon, total carbon and sulphur, methods for determining graphitic carbon, manganese and phosphorus.

Kenneth Falconer, for the Committee on Costs, made a progress report, telling of the questions recently sent out to foundrymen for the collection of data on cost systems now in use, the replies to which have been tabulated by the committee. On motion of H. E. Field, Pittsburgh, the committee was continued and was authorized to expend a reasonable amount of money in collecting and codifying data on cost systems and presenting the information for the benefit of the association.

The remainder of the session was devoted to papers on "Sound Castings," by David Spence, Franklin, Mass., and on "Manganese in Cast Iron," by H. E. Field. Paul Kreuzpointner, Altoona, Pa., made brief remarks on "The Supply of Skilled Labor in the United States," and J. S. Seaman, for the Auditing Committee, reported that the treasurer's accounts were found correct and that for the first time in its history the association had a fair balance in its treasury.

TUESDAY AFTERNOON.

At the afternoon session papers were presented on "Cast Thread Fittings," by Henry B. Cutter, Seneca Falls, N. Y.; "The Evolution of the Foundry Business," by E. B. Gilmour, Elizabethtown, Pa.; "The Gray Iron Foundry as a Business Venture," by Thomas D. West, Sharpsville, Pa.; "The Malleable Foundry as a Business Venture," by Richard Moldenke, and "Small Things in the Core Room Often Neglected," by Henry M. Lane, Cleveland, Ohio.

President McFadden announced the following committee on Nomination of Officers: J. S. Seaman, Pittsburgh; A. Walker, Boston; George C. Davies, Philadelphia; L. L. Anthes, Toronto; Thomas Sheriffs, Milwaukee.

On Tuesday evening a smoker and vaudeville entertainment was held at Lulu Temple, Spring Garden street near Broad, with distribution of an elaborate list of souvenirs.

The Associated Foundry Foremen.

The fifth annual meeting of the Associated Foundry Foremen was held at the Manufacturers' Club on Monday evening, May 20, presided over by Hugh McPhee, Bridgeport, Conn. The report of F. C. Everett, the secretary, showed a present membership of 370, a net increase of 36 over the number reported a year ago. The election of officers of the association for the ensuing year resulted in the choice of the following:

President, James F. Webb, Lake Shore & Michigan Southern Railroad shops, Elkhart, Ind.

First Vice-President, W. S. McQuinnin, Allegheny Foundry Company, Warren, Pa.

Second Vice-President, W. O. Steele, Bateman Mfg. Company, Grenlock, N. J.

Secretary and Treasurer, F. C. Everitt, J. L. Mott Company, Trenton, N. J.

Under the constitution of the Associated Foundry Foremen the presidents of the local associations become vice-presidents of the national organization. These are the following: W. F. Brunan, Erie, Pa.; Thos. Glasscock, Milwaukee, Wis.; E. W. Smith, Chicago, Ill.; Hugh McPhee, New York, and other Eastern territory; W. A. Keller, Indianapolis, Ind.; Hugh McKenzie, Cleveland, Ohio; W. A. Perrine, Philadelphia, Pa.; David Reid, Hamilton, Ont.; H. J. Holmes, Cincinnati.

Hugh McPhee, the retiring president, was elected an honorary member of the association. A committee was appointed to revise some portions of the constitution and by-laws, and the changes will be submitted to letter ballot.

Foundry Supply Association.

An "executive session" of the Foundry Supply Association was held on Monday, at which the following Committee on Nomination of Officers was appointed: Thomas Malone, J. S. McCormick Company, Pittsburgh; Henry E. Pridmore, Chicago; E. J. Woodison, Detroit Foundry Supply Association, Detroit; R. B. Seidel, Philadelphia; C. S. McNeal, Garden City Sand Company, Chicago.

It was reported at this meeting that the membership of the Supply Association has reached 99.

The Next Convention.

It is probable that the invitation from Toronto, Canada, foundrymen to hold the convention of 1908 in that city will be accepted. In that event the foundry equipment exhibit will be held at Niagara Falls, two days being given to Toronto and two days to the exhibit.

The presidency will naturally go to Philadelphia for next year, and the name of Stanley G. Flagg, Jr., will be presented on behalf of the foundrymen of that city.

Presentation to Secretary Moldenke.

A movement which has been under way for some time to give the secretary of the association, Dr. Richard Moldenke, a tangible expression of the good will of the foundrymen of the country culminated in a presentation in connection with the entertainment of Tuesday evening. Dr. Moldenke was given a silver punch bowl and $1200 in gold. The presentation speech was made by H. E. Field of Pittsburgh, and this recognition of Dr. Moldenke's work in behalf of the entire foundry industry of the country was entered into with spirit by the entire assembly.

The Brass Foundry Interests to Organize.

PHILADELPHIA, PA., May 22, 1907. (*By Telegraph.*)—About 75 representatives of brass foundry and allied interests met in the convention hall this morning, and after an address by Charles J. Caley, New Britain, Conn., chairman of a committee appointed last year on a brass association, decided to form such an organization. The following committees were appointed:

Nomination of Officers: Palmer H. Langdon, *Metal Industry*, New York; Charles H. Proctor, F. H. Lovell & Co., Arlington, N. J.; W. R. Webster, Bridgeport Brass Company, Bridgeport, Conn.; A. A. Miller, *The Iron Age*, Philadelphia; Howard Evans, J. W. Paxson Company, Philadelphia; R. Marshall, *Copper and Brass*, Detroit, Mich.; James F. Webb, Elkhart, Ind.

Constitution and By-laws: Richard Moldenke, Watchung, N. J.; Palmer Langdon, New York; W. M. Corse, Detroit Lubricator Company, Detroit, Mich.

The committees will report at a meeting to be held Thrusday morning.

Plate Mill at Gary.—It has been decided to hurry the erection of the 48-in. universal plate mill to be built by the Indiana Steel Company at Gary, Ind., so that it will be ready as soon as steel is available. The mill, which is a duplicate of that at Homestead, can also be used for rolling 78-in. plates for car building purposes. It is probable, but it has not been definitely decided, that the company will build a very large sheet mill at Gary.

The Orient Coke Company, Uniontown, Pa., has elected the following officers: Julian Kennedy, Pittsburgh, president; Robert Bentley, Youngstown, Ohio, vice-president; Reid Kennedy, Homestead, secretary and treasurer; O. W. Kennedy, Uniontown, general manager.

Blast Furnace Gas Explosions.

This is a subject that few blast furnace managers like to talk about, and none care to write about, even if their strenuous duties left them time to do so, which is rarely the case. No one likes to publish the most disagreeable and dangerous incidents of his vocation, especially when their occurrence is considered, sometimes rightfully, more often wrongfully, a reflection on the good judgment and care exercised by the man in charge.

There is nothing in the operation of a blast furnace that puts the nervous strain on a furnace manager or superintendent more than the dread of a gas explosion when blowing in a furnace or putting the blast on after a more or less protracted stop during the campaign; and reasonably so, because it is always a more or less dangerous operation. Numerous serious accidents have occurred on such occasions, resulting not only in great damage to the plant, but not infrequently in loss of life and limb as well. No furnace manager who feels the full responsibility of his position, no matter how trustworthy his assistant or foreman in charge may be, will fail to be present when the blast is put on the furnace for the first time, or at any time after a protracted stop, to make sure that every known precaution has been taken, and to give warning to his men to stand clear of points of danger. A general sigh of relief is breathed by all present who realize the danger and feel the responsibility when the gas is down and burning in the stoves and under the boilers.

Various precautionary measures are taken to reduce the liability of gas explosions, both at blowing in and after protracted stops, with varying success. These measures vary with the ideas of the individuals who put them into practice, and are more or less satisfactory to the users; but nothing positive was developed until J. W. Dougherty, general superintendent of the Pennsylvania Steel Works, during a sleepless night preceding the day set for the blowing in of a large blast furnace, the construction of which did not, in his mature judgment, permit the application of the ordinary methods without very great risk, suddenly struck upon a most simple and effective means, the proper application of which is a positive preventive of all gas explosions.

Mr. Dougherty's method consists broadly in filling practically all the space between the stock in furnace and gas burners in the stoves and under the boilers with a gas or vapor which is neither a combustible nor a supporter of combustion. To prevent gas explosions in furnaces in blast, during or after any stop of longer or shorter duration, it is necessary only to fill the dust catcher and down comer with the inert gas or vapor. When the blast is put on this will act as a piston separating the air which always accumulates in the gas main from the combustible gas which follows this piston, and ignites without a puff as soon as it reaches the several combustion chambers. The means by which Mr. Dougherty's method of preventing gas explosions is accomplished are so simple that the cost of installation will probably in no case exceed $25, and in many cases perhaps not over one-half that sum. The operating expenses are inappreciable and the cost of maintenance is practically *nil*. He has obtained a very broad patent on this method of preventing gas explosions in all European countries, as well as the United States and Canada.

The method has been in use for two years at the Pennsylvania Steel Company's furnaces, both at Steelton and Lebanon, with such unqualified success that there can be no question as to its effectiveness and reliability. There is probably not a furnace, large or small, that does not suffer injury in broken explosion doors, shattered linings in gas mains, &c., amounting to several hundred dollars per annum, to say nothing of the indirect damage due to loss of time, and last, but most important, the incidental accidents caused by such explosions, not infrequently resulting in loss of life. Mr. Dougherty's invention will be welcomed as a boon by all practical blast furnacemen, and no blast furnace proprietor can afford to take the risk of exposing his men and plant to the dangers of gas explosions when there is a positive preventive at hand, which can be applied at so trifling an expense. Further information can be had by addressing E. A. Uehling, sole agent, Passaic, N. J.

PERSONAL.

H. W. Hoyt, who became vice-president of the Allis-Chalmers Company when that company absorbed the Gates Iron Works, of which he was secretary and general manager, has been elected a vice-president of the Great Lakes Engineering Works, Detroit. He has been a director of the latter company since its organization. His special responsibilities in his new work will be in connection with the cost department.

Stewart Marshall, who has been for some years the Pittsburgh representative of the Dunbar Furnace Company, has been appointed manager of the company's two furnaces at Dunbar, Pa.

Hanson McDowell, formerly superintendent of the Hodge Iron Company, Hancock, Mich., is now superintendent of the Enterprise Foundry Company, Muskegon, Mich.

John H. Killinger and M. H. Treadwell, president and treasurer respectively of the M. H. Treadwell Company, whose offices are in the West Street Building, 140 Cedar street, New York, have returned from a three months' trip to Europe, which combined business and pleasure.

The statement was made in a recent issue that Fred Krebs, who had long been superintendent of the Gautier Department of the Cambria Steel Company, Johnstown, Pa., had been appointed general manager of sales of that department. This statement was only partly correct, Mr. Krebs having been appointed general manager of sales of the company. He is now located at the general offices in Philadelphia.

Ralph Crooker, Jr., consulting engineer, Pittsburgh, has returned from Europe.

Robert Aiken, Toledo, Ohio, has been appointed general superintendent of the Lloyd-Booth department of the United Engineering & Mfg. Company at Youngstown, Ohio.

Paul M. Chamberlain has been appointed chief engineer of the Underfeed Stoker Company of America. A graduate of Cornell in 1890, he has been successively connected with the Brown Hoisting Machinery Company, the Frick Company and the Hercules Iron Works. He was assistant professor of mechanical engineering at the Michigan Agricultural College and was afterward identified with the Lewis Institute of Chicago.

W. I. Mann, who recently severed his connection with the engineering department of the Jones & Laughlin Steel Company, Pittsburgh, was the recipient of a handsome testimonial from his associates and friends. Mr. Mann has been connected in an engineering capacity with the development of the steel industry in this country for many years, having been associated with A. L. Holley at Troy and Joliet and with Captain W. R. Jones at the Edgar Thomson Steel Works for many years. He built and was for some years superintendent of the Benwood Steel & Iron Works at Benwood, W. Va., now owned by the Wheeling Steel & Iron Company.

A. L. Hammerberg, for five years chief engineer of the Youngstown Sheet & Tube Company, Youngstown, Ohio, has resigned, effective June 1.

J. H. Hamilton, for some years Western sales agent for the Pittsburgh Steel Company, 403 Security Building, St. Louis, Mo., has resigned and has been succeeded by H. L. Price.

George Reis, formerly identified with the management of the Lackawanna Steel Company and of the steel plant of Milliken Brothers, Incorporated, has been appointed general manager of the Minnesota Steel Company, which is to be the title of the new plant of the Steel Corporation at Duluth, Minn. When the company is fully organized Mr. Reis will be the vice-president and general manager.

NEWS OF THE WORKS.

Iron and Steel.

It is announced that the Ohio Works of the Carnegie Steel Company, Youngstown, Ohio, will operate all the summer on rails and steel billets. For some time the mill has worked two weeks on rails and then two weeks on sheet bar.

The Brown-Bonnell plant of the Republic Iron & Steel Company, Youngstown, Ohio, will be shut down for repairs for two weeks during the first part of July. Ground was broken a few days ago at the old 10-in. mill for the foundations for a new engine. At No. 3 mill work was started last week on two large gas producers, auxiliary to the continuous heating furnaces.

The recently organized American Electric Furnace Company, 45 Wall street, New York, which recently took over the business pertaining to electric furnaces heretofore carried on by the American Grondal Kjellin Company, New York, and the Induction Furnace Company, Newark, N. J., has acquired all patents relating to electric furnaces taken out by F. A. Kjellin and E. A. Colby which were owned by these companies. The company is prepared to furnish furnaces for the treatment of various metals and alloys. The American Grondal Kjellin Company will continue as heretofore its business relating to the concentration and crushing of ores, the manufacture of charcoal and other special processes which have been developed by Gustaf Grondal and associates.

H. A. Zellar, Columbus, Ohio, has purchased from M. Rosenbaum of Pittsburgh, Pa., the rail mill at Huntington, W. Va., operated by the Huntington Rail Mfg. Company, and will organize the West Virginia Rail Company to take over and operate the plant. The plant is now being overhauled and will resume operations in about two weeks, with a monthly output of from 2000 to 2500 tons. Light steel rails from 12 to 30 lb. will be manufactured. The business will be under the management of Mr. Zellar, and the Joseph Schonthal Iron Company, Columbus, has been appointed general sales agent.

The Boonton Iron & Steel Company, Boonton, N. J., is making a number of changes in its mill which will necessitate the erection of a one-story building, covering about 25,000 sq. ft. of floor space. This addition, while it will add somewhat to the output, is to be built more with the intention of making the mill more modern rather than to increase the capacity.

A slight error was made in the note in these columns last week referring to the Harrisburg Pipe & Pipe Bending Company, Harrisburg, Pa. The pipe mill of the company has not been closed down for 18 months, as was stated, although it has been in operation irregularly. The rolling mill has been running on double turn for several years.

General Machinery.

The Anderson Trust Company, Anderson, Ind., has been appointed receiver for the Woolley Foundry & Machine Works. The inventory of the company's plant and business has been ordered by the court, and until this is taken it will not be determined whether the plant will be continued in operation under receivership or be closed indefinitely.

The Vilter Mfg. Company, Milwaukee, Wis., builder of ice making and refrigerating machinery and Corliss engines, is preparing to rebuild and enlarge its pipe working department, in which cutting, threading, welding and soldering of pipes and the making of coils is done. The dimensions of the new building, which will be of brick and steel construction, are 77 x 162 ft., 60 ft. high. Material for this work has been ordered, together with a number of machine tools. Among the recent important contracts closed by this company are a 500-ton refrigerating machine for Peter Doelger, New York; one 500-ton refrigerating machine, Val. Blatz Brewing Company, Milwaukee, Wis.; one 18 and 30 x 42 in. cross compound Corliss engine, Haskell & Barker Car Company, Michigan City, Ind.; one 100-ton refrigerating machine, Bradford Brewing Company, Bradford, Pa., and a 100-ton refrigerating machine, Anthracite Brewing Company, Mt. Carmel, Pa.

The Novelty Iron Works, Sterling, Ill., has started rebuilding the portion of its plant which was recently destroyed by fire. The new buildings will be two stories high, of brick, and will be about 47 x 120 ft. As some of the machinery was not materially damaged the company does not yet know just what new machines it will have to purchase. The company uses water power to operate the plant, and has an emergency steam plant, which is located in the part of the plant that was not burned. Consequently, no power equipment will be needed.

The New Holland Machine Company, New Holland, Pa., which is erecting a new foundry, will purchase a blower and molding machines later on.

The Harbor Commission, Montreal, Que., will receive bids until June 5 for mechanical equipment for the belt conveyor system for the grain elevator.

Work has been begun by the Toledo Ship Building Company, Toledo, Ohio, on a new blacksmith and machine shop, for the erection of which it is estimated $50,000 will be expended. The building, which is to be of fire-proof construction, will have floor space of 35,000 sq. ft., and will not be less than 50 ft. in hight.

The Michigan Automobile Company, Kalamazoo, Mich., has recently increased its mechanical equipment, and will soon be in the market for a horizontal boring mill.

Power Plant Equipment.

Rowlesburg, W. Va., will receive bids until June 1 for one 150-hp. engine, 200-hp. boiler and a 100-kw. transformer, with switchboard, &c., for a municipal electric light plant.

The Board of Sewerage of Morristown, N. J., will receive bids until June 1 for motors, compressors and other supplies.

James F. Morrison, South avenue, Allegheny, Pa., manufacturer of boilers, tanks and sheet iron work, has shipped to the Lockhart Iron & Steel Company, McKees Rocks, Pittsburgh, two two-flue boilers of 100 hp., and is building a steel tank for storing water for elevators, which measures 6 x 6 x 12 ft. long, for the Ferguson Building, Pittsburgh. Orders have been recently completed for two two-flue boilers of 100 hp. for the Monongahela Incline Plane, and three two-flue boilers of 200 hp. for installation in a steamer owned by the W. Kentucky Coal Company, Paducah, Ky.

The Hall Steam Pump Company, Allegheny, Pa., manufacturer of steam pumps, will erect a new foundry, to be of steel and brick construction, 60 x 120 ft., contract for which has been placed with the Fort Pitt Bridge Works, Pittsburgh. It will be equipped with a 20-ton Cleveland electric crane, with 55-ft. span, 25-ft. clearance. The equipment now in use at the old foundry will be moved to the new building and the present foundry building will be dismantled, except that part adjoining the machine shop. This portion will be equipped with necessary machine tools and used as an extension to the machine shop. When these additions have been completed the capacity of the machine shop will have been increased about 50 per cent.

The Rust Boiler Company, German National Bank Building, Pittsburgh, has received a contract for 1200 hp. of Rust water tube boilers for shipment to the Ide Cotton Mill Company, at Atlanta, Ga.

The Ideal Electric & Mfg. Company, Mansfield, Ohio, has been awarded the contract for the machinery equipment for a new lighting and power plant to be installed in Index, Wash., by the Nonpareil Copper & Development Company.

The Barker Boiler Company, Philadelphia, has recently received orders from the Code Portwood Canning Company, Fruitvale, Cal.; Globe Laundry Company and Union Special Machine Company, Chicago, Ill. The order from the Code Portwood Canning Company is a duplicate of one placed with the company about a year ago.

The Board of Public Service of Bellaire, Ohio, will receive bids until June 12 for one 6,000,000-gal. vertical pumping engine for the water works.

The City Council of Thomas, Okla., will receive bids until May 30 for boiler, feed water heater, pumps, air compressor and other water works equipment.

Foundries.

The Advance Foundry Company, Dayton, Ohio, recently incorporated with a capital of $25,000, will rebuild the foundry plant destroyed by fire a few weeks ago. Work upon the new buildings will be begun at once, and when completed will be equipped with new machinery throughout. The incorporators are Thomas M. Sweetman, George A. Engel, Annie Engel, William C. Kette and Mary E. Sweetman.

The Nevada Engineering Works, Reno, Nev., is preparing plans for a new foundry, 50 x 100 ft. and 25 ft. high, with steel truss roof, which will be equipped with a 10-ton Whiting electric crane, core making machines, tumbling barrels and other up to date machinery. Electric power will be used throughout, and an auxiliary steam plant will be installed to be used in case of emergency. R. F. Roy is president. The company manufactures mining and special machinery, iron and brass castings, &c.

The Amherst Foundry Company, Amherst, N. S., is repairing the building of its plant which was recently damaged by fire. Some sand blast machines, enamel mills, blowers, drills, emery grinders, &c., were damaged by the fire, but no heavy machinery, as that class of equipment was in the company's other buildings.

In order to increase the capacity of its foundry the Cast Thread Fittings & Foundry Company, Seneca Falls, N. Y., is tearing down the frame structures at one end of its plant and in their place will erect a brick extension, in which a new cupola will be installed.

The Olive Foundry & Machine Company, Ironton, Ohio, has bought all of the patterns of the Portsmouth Foundry & Machine Company, Portsmouth, Ohio, in which are included the entire stock accumulated since 1846. The list includes steamboat, furnace, rolling mill, brickyard and railroad patterns, which will fill a train of 15 cars.

Bridges and Buildings.

Contracts for steel structural work recently secured by the John Eichleay, Jr., Company, Pittsburgh, include an addition

to the plant of the F. Schenck & Sons Company, Wheeling, W. Va., 175 tons; Hyde Theater, Chicago, 500 tons; an addition to the Curry Building, Pittsburgh, 130 tons, and steel platforms and floors for the engine room of the Pittsburgh Railways Company on Brunots Island, Pittsburgh, about 100 tons.

The charter of the Davis Pressed Steel Company, Wilmington, Del., having expired by limitation, the Davis Solid Trussed Brake Beam Company is now manufacturing the Davis solid trussed brake beams. Nathan H. Davis is president; Thomas C. Davis, vice-president and treasurer, and C. Theodore Buchholz, secretary.

Motors and Small Engines.

The Shelbyville Foundry & Machine Works, Shelbyville, Ind., recently incorporated with a capital stock of $50,000, will engage in the manufacture of gasoline engines from 2 to 10 hp. The company will also do general machine and repair work. It will occupy the old Harris foundry.

The Jamestown Motor Parts Company has been incorporated, with a capital stock of $12,500, at Jamestown, N. Y., to manufacture motors, engines and automobile hardware. The incorporators are S. H. Penfield, E. D. Shearman and C. A. Pickard, who are also interested in the Salisbury Automobile Wheel Company, manufacturer of automobile and motor car trucks and wheels. A factory is to be built later.

Fires.

The machine shop and other buildings of the plant of the Holbrook, Armstrong Iron Company, Racine Junction, Wis., were badly damaged by fire May 11. The loss is placed at $15,000.

The shops of the Webster City Steel Radiator Company, Webster City, Iowa, were damaged $20,000 by fire May 13.

The repair shop of the Boston & Maine Railroad at Woodsville, N. H., was burned May 15.

The foundry of Miller & Rauch, Macungie, Pa., was damaged $6000 by fire May 14.

The plant of the Littlefield Stove Company, Albany, N. Y., was damaged $20,000 by fire May 15.

The plant of the Fulton Machine & Vise Company, Lowville, N. Y., was burned May 19, the loss being about $20,000.

On May 14 fire did $50,000 damage to the plant of the Buckeye Steel Casting Company, Columbus, Ohio.

The pattern and model plant of Brush & Stevens and the plant of the Watt Ornamental Iron & Wire Company, Pittsburgh, Pa., were burned May 17.

The carpenter and repair shops of the Hudson River Division of the New York Central Railroad at Spuyten Duyvil, New York, were destroyed by fire May 21, the loss being about $100,000.

Hardware.

The Cedar Falls Scale & Mfg. Company, Cedar Falls, Iowa, has been incorporated with a capital stock of $20,000. The company will engage in the manufacture of scales of all kinds. George E. Miller is president and secretary, and T. E. Brittan vice-president and general manager.

The Terrell's Equipment Company, recently organized for the manufacture of metal lockers, steel shelving and sheet metal specialties, has leased a plant formerly occupied by the Brass & Iron Bed Company, Grand Rapids, Mich, and will begin operations about June 1. The machinery equipment for the plant has been purchased.

The Western Stamping Company, Alton, Ill., has been incorporated, with a capital stock of $5000, to manufacture bottle caps, special die work and punching presses. The incorporators are P. T. Reyland, Charles E. Fulton and Peter Reyland.

The National Hardware Company, which was recently organized, has purchased the plant of the United States Hardware Mfg. Company in Port Clinton, Ohio. The company will have two buildings, 70 x 300 ft. each, and one building 50 x 400 ft. The plant will be largely devoted to the manufacture of trunk and saddlery hardware.

The Ohio Saddlery Mfg. Company has been incorporated in Columbus, Ohio, with a capitalization of $30,000. The incorporators are M. A. Corbett, F. R. Main, S. A. England and C. B. and G. W. Johnson. The company will make saddles, harness and saddlery supplies.

Acme Tack & Mfg. Company, Minneapolis, Minn., which has recently acquired the business of the consolidated Denny-Stephens Tag Company and the Rosche Machine Works, is making preparations for building a new plant. Its first building will cover about 10,000 sq. ft., and will possibly be all that the company will attempt to construct this year.

The business of Dunbar Bros., Bristol, Conn., manufacturers of clock springs, has been incorporated under Connecticut laws as the Dunbar Bros. Company, with capital stock of $70,000. The incorporators are Edward B. Winthrop, W. Dunbar and Charles E. Dunbar.

Miscellaneous.

The National Metal Company, Mexico City, Mexico, has purchased an extensive site and is preparing plans for the erection of what, when completed, will be the largest refining plant in the republic. The electrolytic process will be largely used and operations will be principally devoted to the separation of gold, silver, copper and lead. The rated capacity of the plant will be 1,800,000 lb. per month, and it is expected to be in working order by the end of the present year.

The Wehrle Company, Newark, Ohio, has purchased the stove plant of the Coshocton Machine Mfg. Company, Coshocton, Ohio. The plant and equipment were sold at receivers' sale and brought $4500.

The Standard Automatic Lubricator Company has been incorporated at Buffalo, N. Y., with a capital stock of $50,000, to manufacture automatic oil pumps and lubricators. Charles W. Manzel, 251 Cedar street, is manager.

The United States Radiator Company, Dunkirk, N. Y., has increased its capital stock from $200,000 to $300,000, the $100,000 additional stock having been subscribed for by the old stockholders. The capital stock was increased to take care of the extension of the company's business. No definite action has been taken as yet toward the building of another plant, for which ground has been purchased and which may be built in the future.

The Hazard Mfg. Company, Wilkes-Barre, Pa., is to erect two new buildings, one to be used for power purposes and the other as an addition to the wire rope department. The first building to be erected will be an addition to the present power plant, making the building 85 x 90 ft. when completed. This building will be equipped with 300 hp. of Babcock & Wilcox boilers and other power machinery. Upon the completion of this building the old boiler plant will be abandoned and that building will be used for manufacturing purposes. Both of the new buildings are to be of brick construction and are to be completed by October 1.

The Sulphite Pulp & Paper Company, Detroit, Mich., has let a contract for the erection of four two-story buildings, 90 x 226 ft., 100 x 110 ft., 44 x 200 ft. and 60 x 107 ft. respectively. The buildings will be of brick, steel and concrete, and will cost about $100,000.

The Norton Emery Wheel Company, Niagara Falls, N. Y., will enlarge its plant on the lands of the Niagara Falls Power Company by the erection of an addition, 77 x 127 ft., for the manufacture of alundum, which has taken the place of emery in many cases.

The E. L. Yancey Carriage Company, Culpeper, Va., has not yet ascertained the kind of machinery it will have to purchase to replace that lost in the recent fire which burned the old part of its plant. The loss amounted to about $10,000, and it is likely that within a short time the company will be in the market for some mechanical equipment.

After continued success with the We-Fu-Go water softening and purifying systems the Illinois Central Railroad has placed with Wm. B. Scaife & Sons Company, Pittsburgh, the eighth and ninth contracts for We-Fu-Go water softening and purifying systems, a 300,000-gal. per day plant for Manchester, Iowa, and a 400,000-gal. per day plant for Waterloo, Iowa. Among recent orders placed for We-Fu-Go and Scaife water softening and purifying systems are the American Steel & Wire Company, Donora, Pa., for 12,500-hp. We-Fu-Go system; American Sheet & Tin Plate Company, Cambridge, Ohio, for 1000-hp. We-Fu-Go system, seventeenth contract; Woodward Iron Company, Woodward, Ala., for 10,800-hp. We-Fu-Go system; Minneapolis, St. Paul & Sault Ste. Marie Railroad, a 250,000-gal. per day We-Fu-Go continuous system; Coshocton Straw Paper Company, for 500-hp. Scaife system.

The Marquette Boiler & Sheet Iron Works, E. F. Kennedy, proprietor, Marquette, Mich., will be ready to turn out work about June 1, the machinery and shop equipment having already been bought. Mr. Kennedy, who was formerly master boiler maker for the Duluth, South Shore & Atlantic Railroad, will make a specialty of boilers, tanks and heavy repair work.

A Pennsylvania charter has been issued to the Oil City Asbestos Company to manufacture asbestos at Oil City, Pa. The company has a capital stock of $100,000 and the incorporators are R. M. and H. M. Nichols, H. M. Kaylor and A. L. Confer.

The W. H. Bundy Recording Company, manufacturer of calculating machines and time recorders, Syracuse, N. Y., has just sold its first Columbia calculating machine to the canal engineers' office in Syracuse, under the jurisdiction of the State of New York. It is increasing its working capital for the purpose of enlarging its factory and exploiting the sale of the Columbia machine. A circular has been issued by the company regarding the litigation between it and the International Time Recording Company, stating that the United States Circuit Court, Norwich, N. Y., has decided that the key lift time recorder does not infringe in any manner the claims of the International Company. An appeal has been taken from the adverse decision rendered as to one claim on the company's shutter lift time recorder, which was decided in favor of the International Company.

The Iron and Metal Trades

As usual, the Illinois Steel Company is the leader in booking Rail orders for forward delivery, and the past week entered 95,000 tons additional, bringing the total for 1908 delivery up to about 250,000 tons. The latest sales include 65,000 tons to the Northern Pacific, 10,000 tons to the Saint Louis & San Francisco, 10,000 tons to the Illinois Central, and 4000 tons to the Great Northern. The Tennessee Company has booked 10,000 tons for the Saint Louis & San Francisco, but the reported sale to the Southern Railway has not yet been effected. One Northern mill has taken business, but is not yet in a position to give out details. There are some additional large inquiries in the market, one company having under consideration about 100,000 tons. Bids have gone in for 5000 tons for Panama, and the Carnegie Company has booked 13,000 tons for Manchuria.

Buying for 1908 delivery has been a feature in other departments of the trade, although in some isolated instances, at least, its significance is somewhat clouded by the fact that the seller protects the buyer against a decline.

An interesting transaction is the sale in Cleveland of 25,000 tons of Malleable Bessemer for delivery during the first half of 1908, on the basis of $22 at Valley furnace. There have been some sales, too, of Southern Iron for the first quarter, on the basis of $18.50, Birmingham, for No. 2. It is understood, however, that the furnaces are not encouraging transactions of this character.

It is estimated that Eastern Steel makers have made additional purchases of Basic Pig, for second half delivery, to the extent of close to 30,000 tons, and there are indications that the movement has not yet quite ended.

Chicago reports the sale in that district of 3000 tons of Middlesbrough Iron, with the probability of further transactions. The English markets have eased off somewhat, warrants being quoted 60 shillings 3 pence to-day for Middlesbrough.

On the whole the Foundry Iron markets have become stronger during the week, although the feeling in the trade persists that prices are unduly high and that a lower level, if it could be safely reached, would be far less dangerous.

The agricultural implement makers have apparently surrendered after a long struggle to secure lower prices for Bars for the season which begins on July 1. They have bought heavily during the past week from the makers in the West and the Central West, and, what is a striking commentary on the reports of crop damage, have taken more tonnage than a year ago.

There has been a good run of business in Structural Material, chiefly in factory structures and office buildings. Western Plate makers continue under heavy pressure, chiefly from the car builders, who are urgent for deliveries. The Sheet mills are catching up only very slowly, and the Tin Plate mills report a good business. The leading Pipe mill has taken an order for 120 miles of 18-in. Pipe. On the whole the demand for finished Iron and Steel holds up remarkably well, and specifications are rolling in rapidly. The new tonnage entered so far this month is, however, somewhat lighter than that of April and of March.

In the Cast Iron Pipe trade the volume of business is rather lighter than is usual this season of the year, which may be due partially to the fact that contracting was done a little earlier. It is noted that the requirements of the gas companies are light this year. The largest order placed during the week was for 8000 tons for Buffalo.

Coke for early delivery has been very weak lately, and strictly first-class Connellsville has sold down to $2 to $2.10 at oven for furnace coke.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

At date, one week, one month and one year previous.

	1907. May22,	1907. May15,	1907. Apr.24,	1906. May23,
PIG IRON, Per Gross ton:				
Foundry No. 2, Standard, Philadelphia	**$25.50**	$25.50	$24.50	$18.50
Foundry No. 2, Southern, Cincinnati	*24.25*	24.25	24.75	16.75
Foundry No. 2, Local, Chicago	**26.50**	26.50	26.00	18.50
Bessemer, Pittsburgh	**24.15**	23.85	23.85	18.10
Gray Forge, Pittsburgh	**22.85**	22.85	21.85	16.50
Lake Superior Charcoal, Chicago	**27.50**	27.50	26.50	19.00
BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh	*30.00*	30.50	30.50	26.00
Forging Billets, Pittsburgh	*35.00*	36.00	36.00	32.00
Open Hearth Billets, Phila	**32.50**	32.50	32.00	28.00
Wire Rods, Pittsburgh	37.00	37.00	37.00	34.50
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross ton:				
Steel Rails, Melting, Chicago	**18.50**	18.50	18.00	14.00
Steel Rails, Melting, Phila	**19.50**	19.50	19.00	16.25
Iron Rails, Chicago	24.50	24.50	24.50	21.25
Iron Rails, Philadelphia	**27.50**	27.50	27.00	21.00
Car Wheels, Chicago	**25.50**	25.00	25.00	19.00
Car Wheels, Philadelphia	**25.50**	25.00	24.00	17.00
Heavy Steel Scrap, Pittsburgh	**18.00**	18.00	17.75	14.50
Heavy Steel Scrap, Chicago	15.50	15.50	15.50	14.00
Heavy Steel Scrap, Philadelphia	**19.00**	19.00	18.75	16.00
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	1.83½	1.83½	1.83½	1.63½
Common Iron Bars, Chicago	1.76½	1.76½	1.76½	1.66½
Common Iron Bars, Pittsburgh	*1.75*	1.75	1.80	1.50
Steel Bars, Tidewater, New York	**1.84½**	1.84½	1.74½	1.64½
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.50
Tank Plates, Tidewater, New York	1.84½	1.84½	1.84½	1.74½
Tank Plates, Pittsburgh	1.70	1.70	1.70	1.60
Beams, Tidewater, New York	1.84½	1.84½	1.84½	1.84½
Beams, Pittsburgh	1.70	1.70	1.70	1.70
Angles, Tidewater, New York	1.84½	1.84½	1.84½	1.84½
Angles, Pittsburgh	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh	1.85	1.85	1.85	1.57½
Skelp, Sheared Steel, Pittsburgh	1.90	1.90	1.90	1.60
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.50	2.50	2.50	2.25
Wire Nails, Pittsburgh	2.00	2.00	2.00	1.85
Cut Nails, Pittsburgh	2.05	2.05	2.05	1.80
Barb Wire, Galv., Pittsburgh	2.45	2.45	2.45	2.30
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	*24.62½*	24.75	25.00	18.75
Spelter, New York	*6.45*	6.50	6.75	5.90
Spelter, St. Louis	*6.35*	6.37½	6.60	5.80
Lead, New York	*6.00*	6.00	6.10	6.00
Lead, St. Louis	*5.92½*	5.92½	5.95	5.90
Tin, New York	**43.75**	43.50	42.00	41.90
Antimony, Hallett, New York	*17.00*	20.00	22.00	27.00
Nickel, New York	45.00	45.00	45.00	40.00
Tin Plate, 100 lb., New York	$4.09	$4.09	$4.09	$3.94

Chicago.

FISHER BUILDING, May 22, 1907.—(*By Telegraph.*)

The brisk movement in Steel Bars has been a commanding feature of market interest the past week. Buying by the larger consumers among the implement makers developed a lively demand, and resulted in the placing of a large tonnage, which it is reported was done at ruling prices. It is significant that the tonnage taken for individual requirements covering the season from July to July was even greater than that of last year. No class of buyers is in closer touch with agricultural conditions than the implement makers, and it is evident that they apprehend no serious results from the crop shortage. Of Standard Section Rails 90,000 tons were last week added to the purchases already made by Western roads for 1908 delivery. It is estimated that uncompleted negotiations for not less than 100,000 tons of Traction Rails are in the hands of sellers awaiting the financing of new interurban line projects, which were halted by the recent tightening of the money market. Specifications for Structural Shapes and Plates show no decline, and the amount of new work developed in buildings, bridges, pipe lines and other structures is producing a very large amount of new tonnage. The only movement of interest in Pig Iron is the sale of 3000 tons of Middlesbrough Iron, which, though not notable in itself, is under present circumstances indicative of more important sales of foreign Iron that are likely to follow. On June 1 the freight rate from Pittsburgh to Chicago, which under the present special Iron and Steel classification is 16½c. for carloads, will be advanced to 18c. for carloads and 21c. for less than carloads. For Billets and Blooms the rate will be $3 per gross ton.

Pig Iron.—The Pig Iron market is, on the whole, decidedly quiet. Very little Southern Iron is being offered for delivery through the third and fourth quarters. The demand from smelters generally for spot Iron is light. Carloads and small lots of resale Iron are supplying this trade in part, but the total volume of it is insignificant. For No. 2 Foundry, Birmingham, $22.50 is the market price for prompt shipment, though in a few instances $22 has been offered for late June delivery. The latter price, however, is exceptional, and is by no means generally available. It is evident from recent sales and inquiries that some of the large consumers are not covered for last half requirements. One such interest has recently bought 3000 tons of Middlesbrough Iron for July and August delivery, and the prospects are that further shipments of considerable quantities of this Iron will reach this market. Last week's sales included Malleable Bessemer and Foundry grades in about equal proportions, one lot of 1800 tons of the former being reported. Though but few of the Northern furnaces have withdrawn from further bookings of forward delivery orders, the whole of the unplaced tonnage is without doubt comparatively limited. Spot prices for Northern No. 2 range from $26.50 to $27.50, the several interests quoting according to the conditions and circumstances involved in each inquiry presented. On last half business $25 to $25.50 is asked. A new Northern furnace recently blown in is reported as showing disappointing results, the output being scarcely half of its rated capacity. The Star Furnace, Jackson, Ohio, has been withdrawn from further engagements for the year. The following prices are for May and June delivery, f.o.b. Chicago:

Lake Superior Charcoal	$27.50 to $28.00
Northern Coke Foundry, No. 1	27.00 to 27.50
Northern Coke Foundry, No. 2	26.50 to 27.00
Northern Coke Foundry, No. 3	26.00 to 26.50
Northern Scotch, No. 1	27.00 to 27.50
Ohio Strong Softeners, No. 1	26.50 to 27.00
Ohio Strong Softeners, No. 2	26.00 to 26.50
Southern Coke, No. 1	27.35 to 27.85
Southern Coke, No. 2	26.85 to 27.35
Southern Coke, No. 3	26.35 to 26.85
Southern Coke, No. 4	25.85 to 26.35
Southern Coke, No. 1 Soft	27.35 to 27.85
Southern Coke, No. 2 Soft	26.85 to 27.35
Southern Gray Forge	25.35 to 25.85
Southern Mottled	25.35 to 25.85
Malleable Bessemer	26.50 to 27.00
Standard Bessemer	25.30 to 25.80
Jackson Co. and Kentucky Silvery, 6 %	31.30 to 31.80
Jackson Co. and Kentucky Silvery, 8 %	32.30 to 32.80
Jackson Co. and Kentucky Silvery, 10 %	33.30 to 33.80

(*By Mail.*)

Billets and Rods.—Transactions in Rods are very meager, no makers having any considerable tonnage to offer. The only sales reported are of small lots, on which prices range from $37 to $38, Pittsburgh. But little is being done in Forging Billets, and $38 and upward, according to size, is still quoted.

Rails and Track Supplies.—Though not attended with the rush that marked the placing of orders last year, buying of important tonnage lots of Standard Section Rails continues. Last week's purchases in this market amounted to over 90,000 tons, all of which was taken by Western roads. An inquiry for 2000 tons of Traction Rails is reported, but no sales of consequence have been closed. We quote as follows: Angle Bars, accompanying Rail orders, 1907 delivery, 1.65c.; car lots, 1.90c. to 1.95c.; Spikes, 2.35c. to 2.45c., according to delivery; Track Bolts, 2.65c. to 2.75c., base, Square Nuts, and 2.80c. to 2.90c., base; Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 30 to 45 lb. sections, $35; 25-lb., $36; 20-lb., $37; 16-lb., $38; 12-lb., $39, f.o.b. mill. Standard Sections $28, f.o.b. mill, full freight to destination.

Structural Material.—Not only are specifications being offered without restaint, but new business is developing in remarkable volume. That the demand should hold with undiminished force, in face of influences which it was thought would certainly affect it adversely, is one of the features of the present remarkable market conditions. Although there have been but few closures of pending contracts during the past week quite a number of new inquiries are reported. Among the contracts let are 3000 tons for the Schlitz Theater and office building, and 400 tons for the Schlitz Brewing Company, Milwaukee. Other work up for figures includes 3800 tons for a cold storage warehouse at Indiana street and the Chicago River, 1300 tons for an addition to Joseph T. Ryerson's & Son's warehouse, 1200 tons for the Mills Building addition, San Francisco, and 350 tons for a power house for the San Francisco Gas & Electric Company. Two bascule bridge contracts for spans over the Chicago River, requiring 4700 tons, will probably be let this week. Prices from store are quoted without change at 2.05c. to 2.10c., and mill prices, at Chicago, are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.86½c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.86½c.; larger than 6 in. on one or both legs, 1.96½c.; Beams, larger than 15 in., 1.96½c.; Zees, 3 in. and over, 1.86½c.; Tees, 3 in. and over, 1.91½c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending and other shopwork.

Plates.—So far as their ability to make deliveries are concerned, the principal makers are in no better position than they have been for weeks. A few mills are able to accept some tonnage in select specifications for fairly prompt shipment, but can in such cases command premiums of $2 to $4 a ton over the regular quotations. Inquiries, mostly of Western origin, are in the market for figures on work involving considerable Plate tonnage. These include 1000 tons of ⅜-in. Plates for a 32-in. pipe line near Walsenberg, Colo.; 1300 tons for steel barges and steamboat hulls, St. Louis, and about 1000 tons for tanks for the Utah Sugar Company, Salt Lake City, Utah. We quote for future delivery as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.86½c. to 2.06½c.; 3-16 in., 1.96½c. to 2.16½c.; Nos. 7 and 8 gauge, 2.01½c. to 2.21½c.; No. 9, 2.11½c. to 2.31½c.; Flange quality, in widths up to 100 in., 1.96½c. to 2.06½c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.96½c. to 2.16½c.; Flange quality, 2.06½c. Store prices on Plates are as follows: Tank Plates, ¼-in. and heavier, up to 72 in. wide, 2.20c. to 2.30c.; from 72 to 96 in. wide, 2.30c. to 2.40c.; 3.16 in., up to 60 in. wide, 2.30c. to 2.40c.; 72 in. wide, 2.50c. to 2.65c.; No. 8, up to 60 in. wide, 2.35c. to 2.45c.; Flange and Head quality, 0.25c. extra.

Sheets.—The congestion at all mills is acute, and in view of a demand that pours in fresh orders as fast or faster than old ones are executed, the prospect for any nearby relief is not assuring. Every mill in the country is overloaded with orders. Galvanized Sheets are not promised by the principal producers short of 22 to 24 weeks. Some of the smaller mills making a limited range of sizes can make somewhat better deliveries of select sizes. For prompt shipment, when it can be given, prices are practically at the discretion of the seller. We quote mill shipments as follows, Chicago: Blue Annealed, No. 10, 2.01½c.; No. 12. 2.06½c.; No. 14, 2.11½c.; No. 16, 2.21½c.; Box Annealed, Nos. 17 to 21, 2.51½c.; Nos. 22 to 24, 2.56½c.; Nos. 25 and 26, 2.61½c.; No. 27, 2.66½c.; No. 28, 2.76½c.; No. 29, 2.86½c.; No. 30, 2.96½c.; Galvanized Sheets, Nos. 10 to 14, 2.81½c.; Nos. 15 and 16, 3.01½c.; Nos. 17 to 21, 3.16½c.; Nos. 22 to 24, 3.31½c.; Nos. 25 and 26, 3.51½c.; No. 27, 3.71½c.; No. 28, 3.91½c.; No. 30, 4.41½c.; Sheets from store: Blue Annealed, No. 10, 2.50c.; No. 12, 2.55c.; No. 14, 2.60c.; No. 16, 2.70c.; Box Annealed, Nos. 18 to 21, 2.80c.; Nos. 22 to 24, 2.85c.; No. 26, 2.90c.; No. 27, 2.95c.; No. 28, 3.05c.; No. 30, 3.45c.; Galvanized from store: Nos. 10 to 20, 3.30c. to 3.35c.; Nos. 22 to 24, 3.55c. to 3.60c.; No. 26, 3.65c. to 3.70c.; No. 27, 3.85c. to 3.95c.; No. 28, 4.15c.; No. 30, 4.65c. to 4.70c.

Bars.—Last week's sales were extremely heavy. The tonnage booked included a large part of the annual season's requirements of the principal implement interests, one of which placed an order for 9000 tons. Over 20,000 tons were taken by a leading mill. In view of existing crop conditions it is remarkable that instead of being diminished the implement contracts were, it is reported, for larger tonnages than those of the previous year. Quotations, Chicago, are as follows: Steel Bars, 1.76½c., with half extras; Iron Bars, 1.76½c.; Hoops, 2.16½c., extras as per Hoop card; Bands, 1.76½c., as per Bar card, half extras; Soft Steel Angles and shapes, 1.86½c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands, 2c., as per Bar card, half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—The demand for Pipe, especially in the smaller sizes, is in excess of mill production. Notwithstanding the withdrawal of quotations by the National Tube Company, more than 60 days ago, unpriced orders received in the meantime have been of such volume that but little progress has been made in the clearance of forward bookings. Now that quotations have been resumed in the new card of discounts issued last week, a lively rush of new business is anticipated, and the prospect for an early resumption of prompt execution of orders is not at all encouraging to waiting buyers. In accordance with the schedule of prices issued by the National Tube Company, on May 14, the following mill discounts are quoted: Black Pipe, ¾ to 6 in., 71.35; 7 to 12 in., 68.35; Galvanized, ¾ to 6 in., 61.35. These discounts are subject to 1 point on the base. From store in small lots, Chicago jobbers quote 68 per cent. on Black Steel Pipe, ¾ to 6 in. About four points advance above these prices is asked for Iron Pipe.

Boiler Tubes.—For both Merchant and Locomotive Boiler Tubes there is an exceedingly active demand. Slow deliveries by the mills is favoring the movement of jobbers' stocks, upon which boilermakers are drawing with unusual freedom to supply urgent needs. In the new price-list issued by the National Tube Company on May 14 Tube prices are the same as was quoted prior to the withdrawal of quotations on March 8. Mill quotations for future delivery on the base sizes are as follows: 2¾ to 3 in., in carload lots, Steel Tubes, 63.35; Iron, 50.35; Seamless, 49.35; 2½ in. and smaller, and lengths over 18 ft., and 2½ in. and

larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1¼ in.	35	35	35
1¾ to 2¼ in.	50	35	35
2½ in.	52½	35	35
2¾ to 5 in.	60	47½	47½
6 in. and larger	50	35	..

Merchant Steel.—Active buying by implement makers has given an impetus to the movement of Finished Machinery and Tire Steel and Special Shapes. One principal producer of these goods reports that its April output was the largest in its history. Prices are firm and unchanged. Quotations are as follows: Planished or Smooth Finished Tire Steel, 1.96½c.; Iron Finish, up to 1½ x ½ in., 1.91½c.; Iron Finish, 1½ x ½ in. and larger, 1.76½c., base; Channels for solid rubber Tires, ¾ to 1 in., 2.26½c., and 1⅛-in. and larger, 2.16½c.; Smooth Finished Machinery Steel, 2.16½c.; Flat Sleigh Shoe, 1.91½c.; Concave and Convex Sleigh Shoe, 2.06½c.; Cutter Shoe, 2.45c.; Toe Calk Steel, 2.31½c.; Railroad Spring, 1.96½c.; Crucible Tool Steel, 7¼c. to 8c., and still higher prices are asked on special grades. Shafting, 50 per cent. off in car lots and 45 per cent. in less than car lots, base territory.

Cast Iron Pipe.—Routine orders of small tonnage comprise the bulk of the business transacted. Appropriations for municipal requirements, which were generally based on last year's prices, have fallen short of the intended tonnage purchase, and in some cases the increased prices have deferred anticipated improvements. In the absence of any new municipal lettings the aggregate of business furnished by current orders is, on the whole, not disappointing in volume. We quote per net ton, Chicago, as follows: Water Pipe, 4 in., $38 to $39; 6 to 12 in., $37 to $38; 16-in. and up, $36 to $37, with $1 extra for Gas Pipe.

Coke.—With foundries all well engaged, the demand for Coke is of normal proportions. Connellsville 72-hr. Foundry Coke is quoted at $3.25 to $3.50 at the ovens, for prompt shipment. Solvay Coke for forward delivery is quoted at $6.50, Chicago.

Old Material.—Contrary to the expectations of those familiar with the market movements in Scrap materials, the market has not responded to influences that some weeks ago indicated a tendency toward lower values. As a result, there are thought to be a number of short interests in the market whose efforts to cover forward sales has materially added to the strength of certain grades. Heavy Melting Steel and Frogs, Switches, and Guards are in demand, and range from 25c. to 50c. higher. Rolling mill grades are supported by liberal buying, and prices are firm. Responding to the higher level of Pig Iron, prices on all Cast grades are slightly advanced, and are exceedingly scarce. Two railroad lists are out, one from the Illinois Central, of 2000 tons, and the other from the Chicago, Burlington & Quincy, of 4800 tons. The following quotations are per gross ton, f.o.b. Chicago:

Old Iron Rails	$24.50 to $25.00
Old Steel Rails, rerolling	18.50 to 19.00
Old Steel Rails, less than 3 ft.	18.50 to 19.50
Relaying Rails, standard sections, subject to inspection	28.00 to 30.00
Old Car Wheels	25.50 to 26.00
Heavy Melting Steel Scrap	15.50 to 16.50
Frogs, Switches and Guards, cut apart	17.00 to 17.50
Mixed Steel	12.50 to 13.00

The following quotations are per net ton:

Iron Fish Plates	$19.00 to $20.00
Iron Car Axles	26.00 to 26.50
Steel Car Axles	21.00 to 21.50
No. 1 Railroad Wrought	15.50 to 16.00
No. 2 Railroad Wrought	14.50 to 15.00
Railway Springs	15.00 to 15.50
Locomotive Tires, smooth	17.00 to 17.50
No. 1 Dealers' Forge	13.00 to 13.50
Mixed Busheling	11.50 to 12.00
Iron Axle Turnings	12.00 to 12.50
Soft Steel Axle Turnings	12.00 to 12.50
Machine Shop Turnings	12.00 to 12.50
Cast Borings	10.00 to 10.50
Mixed Borings, &c.	10.00 to 10.50
No. 1 Mill	10.00 to 10.50
No. 2 Mill	9.00 to 9.50
No. 1 Boilers, cut to Sheets and Rings	11.50 to 12.00
No. 1 Cast Scrap	18.50 to 19.00
Stove Plate and Light Cast Scrap	15.00 to 15.50
Railroad Malleable	16.00 to 16.50
Agricultural Malleable	15.00 to 15.50
Pipe and Flues	12.00 to 12.50

Metals.—No item in the line of Metals exhibits more than ordinary activity, save Pig Tin, which, due to the interference with shipments caused by the longshoremen's strike in New York, has created a temporary scarcity and higher prices. Trade in Copper is quiet, though prices are unchanged. We quote as follows: Casting Copper, 25½c. to 26c.; Lake, 26c. to 26½c., in car lots for prompt shipment; small lots, ¼c. to ⅝c. higher; Pig Tin, car lots, 45¼c.; small lots, 45¾c.; Lead, Desilverized, 6.50c. to 6.60c., for 50-ton lots; Corroding, 7.25c. to 7.35c., for 50-ton lots; in car lots, 2¼c. per 100 lb. higher; Spelter, 7.15c.; Cookson's Antimony, 27½c., and other grades, 26½c. to 27c.; Sheet Zinc is $8.60 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 21¾c.; Heavy Copper Wire, 21c.; Copper Bottoms, 19¾c.; Copper Clips, 20½c.; Red Brass, 20c.; Red Brass Borings, 18c.; Yellow Brass, 17½c.; Yellow Brass Borings, 15½c.; Light Brass, 12c.; Lead Pipe, 6⅛c.; Tea Lead, 5.40c.; Zinc, 5½c.; Pewter, No. 1, 30c.; Tin Foil, 37c.; Block Tin Pipe, 40c.

Philadelphia.

PHILADELPHIA, PA., May 21, 1907.

There need be very little variation from the tone of the report which was made a week ago, except that prices of Pig Iron are a trifle stronger, and the article for prompt delivery is just as scarce. This, in face of the largest production on record, is remarkable, but the fact cannot be denied. How this is going to work out will probably be determined before midsummer, but if production continues to increase, as appears to be somewhat probable, it ought to give some relief even if there is no falling off in consumption. This feature, however, is one of the most difficult problems that has to be considered, as many of the mills complain that they are not getting new business in any considerable volume, and in not a few instances specifications are said to be considerably delayed. The foundries, however, appear to be enormous consumers, and so far it cannot be said that there are any indications of weakening in that direction. As a matter of fact, it is a constant struggle to get enough Iron to keep their plants fully employed, so that looking at the Iron and Steel trades separately, and apart from outside conditions, it cannot be said that developments are in any way unfavorable, but the Iron and Steel trades cannot be conducted for any length of time independently of extraneous influences, which of late have been most decidedly unfavorable. Reports in regard to the crops may have been exaggerated somewhat, but there can be no question that serious damage has been done, and that the season is so late that spring wheat and corn will have to run more than ordinary risks before maturity. Then again the financial situation, if in any degree measured by the attitude of Wall Street, is certainly not encouraging. Some fears are also expressed in regard to the political situation, and the action which may be taken at Washington in regard to some of the large corporations may also cast a shadow over the entire business situation, so that fair and unbiased opinions cannot indulge in any great confidence in the present high prices for Pig Iron. For the present, however, it is undeniably true that the tone and character of the demand are as strong as at any time for months past, and from that viewpoint talk of reaction seems almost puerile.

Pig Iron.—The volume of business during the past week has been of fair proportions, and at firm to somewhat higher prices. The scarcity for early deliveries may not be quite as great, but there is increased firmness for third quarter deliveries, and in some cases for the fourth quarter also. Large consumers are taking forward deliveries with more confidence than was manifested three or four weeks ago, and makers of Pig Iron think they see their way to a demand fully equal to all that they will be able to produce during the remainder of the year. In other words, there are no signs yet that consumption is falling off, and from the fact that consumers are placing orders for tonnages almost equal to the full capacity of the furnaces, it would seem that the attitude of producers is not without some basis of justification. Nevertheless, conditions are such that much skepticism is felt in regard to the final outcome. Foundry Irons probably command more attention than other grades, although Basic has been sold in pretty good sized lots and said to be at the quotations which we gave last week. There is a degree of secrecy, however, about transactions in this grade of Iron that is regarded with more or less suspicion, although there is no reason to think that the prices at which sales are said to have been made are not correct; but whether there was any string to the transactions or not is not altogether clear, although sellers state emphatically that the transactions were without any proviso different from those in ordinary contracts. May and June shipments are firm at the full quoted rates, and, in fact, they are strong for all deliveries at the prices named in the quotations given below. Low Phosphorus Iron is in moderate demand, at somewhat better prices, as that grade cannot be imported at less than $27 on dock, duty paid, although a few sales have been made by American furnaces at about $27.50, delivered. The full range, however, would be $27.25 to $27.50, delivered. General quotations for deliveries in eastern Pennsylvania and adjoining districts are about as follows:

May and June Deliveries.	
No. 2 X Foundry	$25.50 to $26.50
Gray Forge	22.75 to 23.25
Basic	25.00 to 25.50
Middlesbrough, No. 3	22.50 to 23.00
Scotch Iron	24.50 to 25.00
Third Quarter 1907.	
No. 2 X Foundry	$24.50 to $25.00
Gray Forge	22.50 to 22.75
Basic	23.75 to 24.25
Low Phosphorus	27.25 to 27.50
Fourth Quarter 1907.	
No. 2 X Foundry	$23.50 to $23.75
Basic	23.00 to 23.50
Gray Forge	22.00 to 22.50

Ferroalloys.—There is little or no business to report, but orders for Ferro could be placed at about $63 for deliveries during the last half, or $65 to $68 for May and June. Quotations are more or less nominal, however, and liable to revision on short notice.

Steel.—There is more demand for Steel, and prompt shipments would probably command a slight premium. Large renewal orders are on the market, but buyers hesitate to pay the advance as compared with prices paid on their last purchases. The market is strong, however, and in view of the continued increase in the cost of raw materials makers are firm, at $32.50 to $33 for nearby deliveries of ordinary Rolling Billets, and $36 to $38 for Forging Steel, the latter being in specially good demand.

Plates.—The movement in Plates is of a somewhat dilatory character. Consumers are specifying pretty fairly, so that the mills are well employed in most of the departments, although in some they would be glad to accept new business, which is not offered in any large volume. The market cannot be called weak, but there is an absence of buoyancy which is somewhat in contrast with the conditions which prevailed earlier in the year. There is a good deal of inquiry, however, and manufacturers feel rather confident that a large output will be required during the summer and fall months. Prices remain as last quoted, namely:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel	1.93½	1.98½
Flange or Boiler Steel	2.03½	2.08½
Marine	2.23½	2.28½
Locomotive Firebox Steel	2.43½	2.48½

The above are base prices for ¼-in. and heavier. The following extras apply:

	Extra per 100 lb.
3-16-in. thick	$0.10
Nos. 7 and 8, B. W. G.	.15
No. 9, B. W. G.	.25
Plates over 100 to 110 in.	.05
Plates over 110 to 115 in.	.10
Plates over 115 to 120 in.	.15
Plates over 120 to 125 in.	.25
Plates over 125 to 130 in.	.50
Plates over 130 in.	1.00

Structural Material.—Local conditions do not indicate any unusual demand, although there is enough business coming in from time to time to maintain the *status quo*. The large amount of work which has been taken by the fabricators of material enables the local mills to take on a good deal of business in small and medium sized lots, but it cannot be said tht there is anything specially encouraging as to the outlook for the summer and fall months, although it is quite possible that something unexpectedly favorable may devolep in the near future. In the meanwhile prices remain as last quoted, namely, 1.83½c. to 2c. for Beams, Channels and Angles, according to specifications.

Bars.—If we say that business holds its own it is probably as much as ought to be said with due regard to actual conditions. Prices are pretty steady at 1.83½c., but specifications are not as prompt as could be desired, so that in some departments the mills could do a good deal more work if they had specifications in hand. Steel Bars are scarce for prompt delivery, and although they are nominally quoted at 1.73½c., they command about the same prices as Refined Iron, unless deliveries are to be made at such times as suit the convenience of the manufacturer.

Sheets.—The demand is very satisfactory, mills having plenty of work which is promptly specified for, so that while prices are nominally unchanged, it is not difficult to get a slight premium for immediate shipments. Prices as follows for mill shipments, subject to the usual advance for small lots: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 to 26, 3c.; No. 27, 3.10c. and No. 28, 3.20c.

Old Material.—The situation is extremely abnormal and, if such an expression is permissible, everything is in a tangle. Dealers cannot get enough material to cover their contracts and are compelled to pay more money than the mills are paying, thereby establishing two sets of quotations—one for the consumer, the other for the dealer—but which will come out ahead is an open question. Meanwhile the general range of bids and offers for deliveries in buyers' yards in eastern Pennsylvania is about as follows:

Steel Crops and Rails	$19.50 to $20.00
No. 1 Steel Scrap	19.00 to 19.50
Low Phosphorus	24.50 to 25.00
Old Steel Axles	21.75 to 22.25
Old Iron Axles	30.50 to 31.50
Old Iron Rails	27.50 to 28.00
Old Car Wheels	25.50 to 26.00
Choice No. 1 R. R. Wrought	20.50 to 21.00
No. 1 Yard Scrap	19.00 to 19.50
Long and Short	18.50 to 19.00
Machinery Scrap	20.50 to 21.00
Wrought Iron Pipe	17.00 to 17.50
No. 1 Forge Fire Scrap	16.50 to 17.00
No. 2 Light	11.50 to 12.00
Wrought Turnings	17.00 to 17.50
Heavy Machinery and Axle Turnings	17.25 to 17.75
Stove Plate	17.75 to 18.00
Cast Borings	16.00 to 16.25
Grate Bars	16.50 to 17.00

Pittsburgh.

PARK BUILDING, May 22, 1907.—(*By Telegraph.*)

Pig Iron.—Considerable inquiry for Malleable Bessemer, Basic, Foundry and Charcoal Iron is reported for the first quarter of next year, and some tonnage has been sold. There is not much doing in Pig Iron for delivery in third or fourth quarters, the available supply being pretty well cleaned up, and consumers having also covered. Bessemer and Basic Iron for June and also for third quarter delivery are held at $23.50 to $24, and for last half of the year at $23, Valley furnace. We note two sales of Malleable Bessemer of 1000 tons each for June delivery at $23.50, Valley furnace. A sale is also reported of 25,000 tons of Malleable Bessemer for delivery in the first quarter of next year, made by a Cleveland interest, on the basis of $22, Valley furnace. Several of the leading local consumers of Foundry Iron, who were said to have fully covered their requirements for last half of the year, are expected to be in the market before long for considerable Iron. We quote Northern No. 2 Foundry for spot shipment at $25.50 to $26; for third quarter, $24 to $24.50, and for last half, $23 to $23.50, Valley furnace. We quote Northern Forge Iron at $22, Valley furnace, or $22.85, Pittsburgh.

Steel.—Some consumers report better deliveries by the mills on Billets and Sheet and Tin Bars. We quote Bessemer Billets at $30 to $30.50, and Open Hearth Billets at $31.50 to $32, Pittsburgh. There has been some activity in Forging Billets in this market recently, and we note a sale of 3000 tons by an outside mill at $35, Pittsburgh. Sheet and Tin Bars in random lengths are held at about $31, at maker's mills, Pittsburgh or Youngstown.

(*By Mail.*)

The feature of the situation is the active inquiry for Malleable Bessemer, Basic and Foundry Pig Iron for the first quarter of next year, and considerable tonnage has already been sold, especially of Malleable Bessemer. The fact that consumers would make contracts for Iron for such a long period ahead indicates confidence in the future, and it is very significant at this time. There is not much doing in Pig Iron for this year's delivery, but there is very little Bessemer or Basic to be had, and the furnaces making Foundry Iron are also well sold up, although they still have some Iron for last half of the year. The Steel market is showing signs of betterment in supply and prices are a shade easier. An Eastern Steel mill has sold a considerable tonnage of ordinary Bessemer Billets and Forging Billets in this market recently for delivery in third quarter. In Finished Material the demand holds up remarkably well, but the actual tonnage entered so far in May has not been as heavy as in last month, and still lighter as compared with March. However, most of the Steel interests report specifications, and orders still in excess of shipments. This applies particularly to Steel Bars and Plates, two or three of the leading interests being sold up as far ahead as November. The weak features of the whole market are Coke and Scrap, these two products being relatively low in price and dull in demand.

Ferromanganese.—The low prices ruling in this market for early delivery are attracting buyers, and there is considerable inquiry. A sale of about 300 tons of foreign 80 per cent. Ferro, deliveries running over four months, commencing June, is reported on the basis of about $66, Pittsburgh. Much lower prices are being quoted for delivery over last half of the year, 80 per cent. foreign Ferro being offered at $61 to $62, Baltimore, or about $63 to $64, Pittsburgh.

Skelp.—A leading consumer is reported to have placed a contract recently for Sheared Iron Skelp, deliveries running over last half of the year on the basis of 2.27½c. to 2.30c., Pittsburgh. There has been a great scarcity in the supply of Skelp for some time, and prices have been high. For forward delivery we quote: Grooved Steel Skelp, 1.85c. to 1.90c.; Sheared Steel Skelp, 1.90c. to 1.95c.; Grooved Iron Skelp, 2.20c. to 2.25c.; Sheared Iron Skelp, 2.30c. to 2.35c.

Rods.—We note a continued scarcity in the supply of Rods, which are very hard to obtain for reasonably prompt delivery. We quote Bessemer and Open Hearth Rods at $37 to $38, Pittsburgh, the higher price being asked for prompt delivery.

Steel Rails.—The Carnegie Steel Company has taken an order for 13,000 tons of Standard Sections for shipment to Japan and has also taken considerable domestic tonnage, including about 3000 tons of Light Rails. We quote Light Rails as follows: $33 to $34 for 20 to 45 lb.; $34 to $35 for 16-lb., and $35 to $36 for 12-lb., at mill. Angle Splice Bars are held at 1.65c., and Standard Section Rails at $28, at mill.

Structural Material.—The McClintic-Marshall Construction Company has taken the Steel for the cast house, engine and boiler house for the new blast furnace plant of the Youngstown Sheet & Tube Company, Youngstown, Ohio, about 2000 tons, and also the Ellsworth avenue bridge in this city, about 800 tons. The Riter-Conley Mfg. Company has taken the cast house, and the Fort Pitt Bridge Works the boiler and engine house, for the new blast furnace plant of the Jones & Laughlin Steel Company, at Aliquipa, taking in all about 700 tons of Steel. Inquiries are in the market for a good deal of work, but some of the large jobs are materializing very slowly, possibly due to the tightness of the money market. Deliveries on Structural Shapes by some of the mills are fairly prompt, but on Plates and Steel Bars are much delayed. We quote: Beams and Channels, up to 15 in., 1.70c.; over 15-in., 1.80c.; Angles, 3 x 2 x ¼ in. thick up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3½ in., 1.80c.; Zees, 3 in. and larger, 1.70c.; Tees, 3 in. and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3 in. are 1.70c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Plates.—Specifications against contracts are coming in freely and a good deal of new tonnage is being placed, but this is not as heavy as in April, and is still lighter as compared with March. Some of the Plate mills can make reasonably prompt deliveries for which they are still able to secure slight premiums. We quote: Tank Plate, ¼-in. thick, 6¼ in. up to 100 in. wide, 1.70c. to 1.80c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than ¼-in. to and including 3-16-in. Plates on thin edges	$0.10
Gauges Nos. 7 and 8	.15
Gauge No. 9	.25
Plates over 100 to 110 in.	.05
Plates over 110 to 115 in.	.10
Plates over 115 to 120 in.	.15
Plates over 120 to 125 in.	.25
Plates over 125 to 130 in.	.50
Plates over 130 in.	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
"A. B. M. A." and ordinary Firebox Steel Plates	.20
Still Bottom Steel	.30
Marine Steel	.40

Shell Grade of Steel is abandoned.

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within 10 days from date thereof, discount of ½ of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Sheets.—The mills are catching up very slowly on back deliveries, and both Black and Galvanized Sheets, particularly the latter, are difficult to obtain for prompt delivery and command premiums of $2 to $3 a ton or more over regular prices. Some of the Sheet mills report slightly better deliveries on Sheet Bars, while others say there is no improvement as yet. Prices for forward delivery are as follows: Blue Annealed Sheets, No. 10 gauge and heavier, 1.85c.; Nos. 11 and 12, 1.90c.; Nos. 13 and 14, 1.95c.; Nos. 15 and 16, 2.05c.: Box Annealed, Nos. 17 to 21, 2.35c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.45c.; No. 27, 2.50c.; No. 28, 2.60c.; No. 29, 2.75c.; No. 30, 2.85c. We quote Galvanized Sheets as follows; Nos. 10 and 11, 2.65c.; Nos. 12 and 14, 2.75c.; Nos. 15 and 16, 2.85c.; Nos. 17 to 21, 3c.; Nos. 22 and 24, 3.15c.; Nos. 25 and 26, 3.35c.; No. 27, 3.55c.; No. 28, 3.75c.; No. 29, 4c., and No. 30, 4.25c. We quote No. 28 gauge Painted Roofing Sheets at $1.85 per square, and Galvanized Roofing Sheets, No. 28 gauge, $3.25 per square, for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances.

Hoops and Bands.—A fair amount of new tonnage is being placed, which in some cases brings premiums of $1 to $2 a ton over official prices, which are as follows: Steel Hoops, 2c., and Bands for all purposes at 1.60c., base, half extras, as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of $2 a ton being charged for less than carloads.

Cotton Ties.—Large contracts for season delivery continue to be placed, and up to this time about 1,800,000 bundles have been contracted for at the official price of 95c. a bundle.

Tin Plate.—The demand for both Bright and Terne Plate continues fairly active, some of the large consumers placing heavy contracts for Bright Plate for last quarter of the year delivery. It is not believed that there will be any change in the price of Tin Plate in the near future. We quote for third and fourth quarter delivery as follows: $3.90 for 100-lb. Cokes, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in 10 days, on which price a rebate of 5c. a box is allowed for carload and larger lots.

Bars.—Some of the large consumers of Steel Bars, among these being the implement makers, wagon builders and some of the railroads, have placed heavy contracts for delivery up to July 1 of next year. The Republic, Carnegie and Jones & Laughlin companies have entered large orders of this kind, and more is pending, which will likely be placed within a very short time. The implement makers were utterly unable to secure any concession in the price of Steel Bars, and all this large tonnage was placed at the full price of 1.60c., Pittsburgh, without any commissions, rebates or anything of that kind. Prompt deliveries of Steel Bars continue to demand from $3 to $4 a ton premium over this price. There is a moderately active demand for Iron Bars and prices are fairly strong. We quote Refined Iron Bars at 1.75c. to 1.80c., Pittsburgh, and Steel Bars for forward delivery at 1.60c., base, half extras, f.o.b. Pittsburgh.

Spelter.—Little new business is offering and prices are lower. We quote prime grades of Western Spelter at 6.35c., St. Louis, equal to 6.47½c., Pittsburgh, for prompt shipment. On a firm offer this price would likely be shaded.

Railroad Spikes.—We note a moderately active demand for Standard sizes, and a heavy demand for the smaller sizes, on which the mills are considerably behind in deliveries. We quote Standard sizes at $2.25 and the smaller sizes at $2.40 to $2.45 per 100 lb., f.o.b. Pittsburgh.

Merchant Steel.—A feature of the market is the higher prices ruling for Crucible Tool Steels, which are selling at the highest prices in some years. We also note an active demand for Tire and Machinery Steel and also for Shafting. Prices are firm, as follows: Smooth Finished Machinery Steel, 1.85c. to 2c., depending on quality; Flat Sleigh Shoe, 1.65c. to 1.75c.; Cutter Shoe, 2.15c. to 2.20c.; Toe Calk Steel, 2.10c. to 2.15c.; Railroad Spring Steel, 1.75c. to 1.80c.; Crucible Tool Steel, 6c. to 8c., for ordinary grades, and 10c. and upward for special grades. We quote Cold Rolled Shafting at 50 per cent. off in carloads, and 45 per cent. in less than carloads, delivered in base territory.

Merchant Pipe.—Contracts for large Pipe lines continue to be placed, among these being one for 14 miles of 12-in., and another for 120 miles of 18-in., both taken by local mills. The new basing discount card issued by the National Tube Company on May 14 should not be taken to mean that this interest is in position to make prompt deliveries on new business. On the contrary, the issuing of this new discount card does not affect deliveries, and the company, while willing to accept business based on the new discounts, is still booking orders to be shipped at its convenience, after orders already on its books have been shipped out. It is practically certain that there will be a general increase in freight rates on Wrought Pipe between now and June 1, and the Pipe mills are inserting clauses in contracts where delivered prices are made, stating that these prices are subject to revision to equalize any change in rate of freight at time of shipment. Official discounts on Steel Pipe are as follows:

Merchant Pipe.

	Jobbers, carloads. Steel. Black. %	Galv. %
⅛ to ¼ in.	65	49
⅜ in.	67	53
½ in.	69	57
¾ to 6 in.	73	63
7 to 12 in.	70	55
Extra strong, plain ends:		
⅛ to ⅜ in.	58	46
½ to 4 in.	65	53
4½ to 8 in.	61	49
Double extra strong, plain ends:		
½ to 8 in.	54	43

All above discounts are subject to 1 point on the base and 5 per cent. on the net.

Official discounts on Iron Pipe, which are shaded one-half point or more to the large trade, are as follows, f.o.b. Pittsburgh:

Standard Genuine Iron Pipe.

	Black. %	Galv. %
⅜ to 6 in.	67	57
½ in.	62	50
⅜ in.	60	42
⅛ and ¼ in.	58	42
7 to 12 in.	62	47
Extra Heavy Iron Pipe, Plain Ends.		
⅛, ¼ and ⅜ in.	62	40
½ to 4 in.	59	47
4½ to 8 in.	55	42

Boiler Tubes.—The demand for both Merchant and Locomotive Tubes continues abnormally heavy, some of the largest railroads in the country having placed large contracts for Steel Boiler Tubes, 2¾ x 5 in., at the full official discount of 65 and 5 per cent. off. Discounts on Boiler Tubes for forward delivery are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ in.	41	47
1¾ to 2¼ in.	42	59
2½ in.	47	61
2¾ to 5 in.	52	65
6 to 13 in.	42	59

2½ in. and smaller, over 18 ft. long, 10 per cent. net extra.
2¾ in. and larger, over 22 ft. long, 10 per cent. net extra.

Coke.—It is evident that a good many consumers of Coke over-bought when they made contracts for first half of the year delivery, and as a result they are shutting off shipments, throwing a large quantity of both Furnace and Foundry Coke on the market, which has to be sold at practically whatever prices it will bring. A large number of new Coke plants without furnace connections have also been started up within the last three or four months, and in order to find a market for their output these concerns are naming relatively low prices. We are advised that strictly Connellsville Furnace Coke for prompt shipment is offered as low as $2 to $2.10 a ton, and 72-hr. Foundry at $3 a ton at oven. A sale of 100 cars of good quality of Foundry Coke for prompt delivery is reported at $2.75 a ton at oven. Should these low prices for prompt Coke continue to prevail, they will have the effect of depressing prices on contracts for Coke for last half of the year delivery. We are advised that Connellsville Furnace Coke on contracts for last half has been offered as low as $2.65 a ton at oven, and 72-hr. Foundry at $3.25 a ton, at oven. Coke concerns who sold Coke late last year or early this year in exchange for Pig Iron, on the basis of seven tons of Coke for a ton of Iron have decidedly the best of the situation at present, and are getting higher prices for their Coke than are ruling in the open market. The output continues very heavy, the Upper and Lower Connellsville regions having made last week 415,482 tons. There are 32,415 ovens in the Upper and Lower Connellsville regions, of which 32,415 were active last week, and only 2055 were idle.

Iron and Steel Scrap.—Conditions in the Scrap trade continue unusually quiet as far as sales are concerned, and the tone of the market is weak. Consumers decline to place contracts for future delivery, confining their purchases to actual requirements. The Baltimore & Ohio Railroad sold last week about 3500 tons of miscellaneous Scrap and about 2500 tons of Rerolling Rails. Of this material, No. 1 Railroad Wrought Iron Scrap sold at about $19; Wrought Iron Turnings, $15.50; Iron Axles, $31.25; Cast Scrap, $21.50; Malleable Scrap, $20.50; Cast Iron Borings, $14, and Heavy Melting Steel, about $18.50, all per gross ton, f.o.b. Pittsburgh. The Rerolling Rails sold on the basis of $19, Elyria, Ohio, and $19.50. Cumberland, Md., these prices being equal to about $19, Pittsburgh. Dealers quote about as follows: Heavy Steel Scrap, $18 to $18.50, for Pittsburgh, Steubenville and Sharon delivery, prices depending on quality; No. 1 Railroad Wrought Scrap, $18.50 to $19, and No. 2, $18 to $18.25; Bundled Sheet Scrap, $16; Machine Shop Turnings, $15.50; Old Steel Rails, short pieces, for Open Hearth purposes, $18 to $18.25; Old Steel Rails, rerollers, $18.50; Old Car Wheels, $26 to $26.25; Steel Axles, $21 to $21.50; Low Phosphorus Melting Stock, $22 to $22.50; Grate Bars, $16.25 to $16.50; Cast Iron Borings, $14 to $14.25; No. 1 Cast Scrap, $22; Stove Plate, $16 to $16.25. All the above prices are per gross ton, f.o.b. Pittsburgh, unless otherwise noted. We note sales of about 300 tons of Cast Scrap on the basis of $21.90 to $22, Pittsburgh.

Cincinnati.

FIFTH AND MAIN STS., May 22, 1907.—(*By Telegraph.*)

Pig Iron.—Perhaps the most important feature in the Pig Iron situation that has developed during the week is the reaching forward by a number of buyers into 1908. Some of this business was for first quarter requirements, and in a few cases delivery covered the entire first half. The situation in this regard is to say the least very peculiar and perhaps almost without precedent. Reports show one sale of special Charcoal Iron covering the entire year of 1908, with an inquiry contemplating about 1500 tons of Foundry grades running from October to October. Prices for next year's delivery are strong, and appear to be well established, averaging $22 for Northern brands of No. 2, Hanging Rock, and $18.50, Birmingham, for No. 2 Southern. The available supply of Iron for the remainder of this year appears to be rapidly diminishing, and it looks as though there were sufficient consumers that are still short to consume the current make of the various furnaces. Second and third quarter prices are quotable at $21.50 to $22 and $20 to $20.50, respectively, with fourth quarter showing an advance from $19.50 to $20. One concern in this territory recently bought 1000 tons of Southern grades for delivery running through the last five months at $20, and is now in the market for 500 tons additional. A sale of 1000 tons of Northern grades is reported at $22, Valley furnace, delivery covering the first three months of next year. There is an inquiry pending for 1500 tons of Basic for third quarter delivery that will perhaps be settled this week. Freight rates from Hanging Rock District to Cincinnati are $1.15, and from Birmingham, $3.25. We quote for second quarter delivery, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$24.75 to $25.25
Southern Coke, No. 2	24.25 to 24.75
Southern Coke, No. 3	23.75 to 24.25
Southern Coke, No. 4	22.75 to 23.25
Southern Coke, No. 1 Soft	24.75 to 25.25
Southern Coke, No. 2 Soft	24.25 to 24.75
Southern Coke, Gray Forge	21.75 to 22.25
Southern Coke, Mottled	20.75 to 21.25
Ohio Silvery, 8 per cent. Silicon	30.65 to 31.15
Lake Superior Coke, No. 1	24.65 to 25.15
Lake Superior Coke, No. 2	24.15 to 24.65
Lake Superior Coke, No. 3	23.65 to 24.15

Car Wheel Irons.

Standard Southern Car Wheel	$29.00 to $29.50
Lake Superior Car Wheel	27.50 to 28.00

Coke.—The market is more active and there is considerable buying for last half requirements, as well as into the first part of next year. Prices are about the same as at last report, and range from $3.25 to $3.50 f.o.b. ovens for best brands of Connellsville and Virginia Foundry.

Finished Iron and Steel.—Specifications for Structural Shapes and Plates have been coming forward in a very active manner during the past week, and the mills are getting farther behind in deliveries. Prices appear to be well established and strong. We quote, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.93c., with half extras; smaller lots from store, 2c., with full extras. Steel Bars, carload lots, 1.73c., half extras, smaller lots from store, 1.95c., with full extras. Base Angles, carload lots, 1.83c. Beams and Channels, carload lots, 1.83c., base. Plates, ¼-in. and heavier, carload lots, 1.83c., base, and smaller lots from store, 2.25c. Sheets, No. 16, carload lots, 2.05c., and smaller lots from store, 2.60c.; No. 14, carload lots, 1.95c., and smaller lots from stock, 2.50c. Steel Tire, 1 x ¼ in. or heavier, 1.93c. in carload lots.

Old Material.—The demand is quite active, and general conditions are strong, with all reports indicating a light tonnage available. We quote dealers' prices, f.o.b. Cincinnati, about as follows:

No. 1 R. R. Wrought, net ton	$16.50 to $17.00
Cast Borings, net ton	9.00 to 9.50
Steel Turnings, net ton	12.00 to 12.50
No. 1 Cast Scrap, net ton	17.50 to 18.00
Old Iron Axles, net ton	25.50 to 26.00
Old Iron Rails, gross ton	24.00 to 25.00
Old Steel Rails, long, gross ton	17.50 to 18.00
Relaying Rails, 56 lb. and up, gross ton	28.25 to 29.25
Old Car Wheels, gross ton	24.00 to 24.50
Low Phosphorus Scrap, gross ton	19.50 to 20.00

The furnace of the Goshen Iron Company at Goshen, Va., was blown in May 13. This furnace will run on Foundry grades, having an output of about 150 tons per day. The iron, which will be known as Victoria, is to be handled by Rogers, Brown & Co. exclusively.

Birmingham.

BIRMINGHAM, ALA., May 19, 1907.

Pig Iron.—The practically sold up condition of the furnaces in this district for all the deliveries of this year, with the exception of the last quarter, has necessarily reduced trading to a minimum during the past week. The most surprising thing is the number of consumers, and many of them large ones, who have not covered for requirements for the last half. Some very shrewd buyers are still hesitating, claiming furnaces are withholding a large percentage of their make to sell as spot Iron, and as this will probably exceed demand, they hope to be able to buy at lower prices than are now prevailing. While there is no doubt furnaces have been more conservative in their sales for future delivery than heretofore, it is believed this has been brought about more through a desire to take care of their trade than with a view of selling at advanced prices. Many melters, in placing contracts for last half Iron, have demanded to know if it was the policy of the furnaces to sell only what would be produced, and if they could depend on getting the Iron bought. At the present prices melters are not inclined to buy more than actual requirements, and are placing their orders with the expectation of getting the Iron when due. The furnaces in this district are realizing that they cannot treat their trade as they have been doing during the past several months and hold it, and for this reason none of them are willing to book orders which they know it will be impossible for them to deliver. There has been little change in prices during the past week, quotations ranging about as follows: Spot shipment, $22.50 to $23; May and June, $22 to $22.50; third quarter, $21 to $21.50, and last quarter, $20. For the first quarter of 1908, some small sales are reported, at $18.50. These are confined to the smaller melters, and it is understood that none of them were for more than 500 tons.

The No. 1 furnace of the Tennessee Coal, Iron & Railroad Company, at Bessemer, was blown in this week. It is very probable, however, that the No. 2 furnace of this company, at the same place, which was expected to be ready for operation this month, will not be blown in for 30 days, owing to inability to get necessary material for repairs.

The new Etowah furnace of the Alabama Consolidated Coal & Iron Company, at Gadsden, has been finished, and will be blown in this week. This stack was designed by M. W. Bush, general manager of the company, and built under his supervision. In design and construction it is thoroughly modern, and is one of the most complete plants in the South.

Cast Iron Pipe.—From the manufacturers' standpoint the condition of the Cast Iron Pipe market is just about all that could be desired. All have enough business to run them well into the summer at remunerative prices, and the amount of new business received each week is gratifying in the extreme. Many buyers are making private contracts and are not advertising for bids as heretofore. There is, therefore, a great deal of business being placed the outsiders never hear of. The unsettled weather during the past two months has delayed building operations and retarded the Cast Iron Soil Pipe season somewhat, but orders are now coming in freely, and the foundries in this district have all the business they can handle. Owing to the unfavorable labor conditions, it is expected the demand for this commodity will exceed the supply this year. Quotations on Water Pipe at present are about as follows, per net ton: 4 to 6 in., $36; 8 to 12 in., $34; over 12 in., average, $31; with Gas Pipe $1 extra per ton.

Old Material.—The situation in the Scrap market remains unchanged. The supply of Heavy Cast is limited, and dealers have no difficulty in placing all they can secure. Wrought is inactive, and while stocks are large, there is no inclination to shade prices in order to move the accumulation. Dealers' quotations are approximately as follows, per gross ton, f.o.b. cars here:

Old Iron Rails	$22.00 to $22.50
Old Iron Axles	18.50 to 19.00
Old Steel Axles	16.50 to 17.00
Old Car Wheels	20.50 to 21.00
No. 1 Railroad Wrought	18.50 to 19.00
No. 2 Railroad Wrought	13.00 to 13.50
No. 1 Country Wrought	13.00 to 13.50
No. 2 Country Wrought	12.00 to 12.50
Wrought Pipe and Flues	13.50 to 14.00
Railroad Malleable	13.00 to 14.00
No. 1 Steel	14.00 to 14.50
No. 1 Machinery Cast	16.50 to 17.00
Stove Plate and Light Cast	12.50 to 13.00
Cast Borings	8.50 to 9.00

Cleveland.

CLEVELAND, OHIO, May 21, 1907.

Iron Ore.—The movement of Ore from the upper lake ports is much better than it was a week ago, but the situation is still unsatisfactory to shippers. At present the Ore boats are about three weeks behind, and it will take some lively work to catch up. It is expected that the May Ore receipts will be a little better than those of May, 1906, but it is not believed that the receipts for April and May will exceed, even if they equal, the receipts during the first two months of last year. Most of the vessel men are hustling to keep up on their contracts, and offerings of Ore tonnage at the head of the lakes are light. Chartering is not as active as it usually is at this time of the year, as the bulk of the Ore has been covered by freight contracts. The Ore market is very quiet, there being only an occasional inquiry for a small lot. Prices are unchanged, being as follows at Lake Erie docks, per gross ton: Old Range Bessemer, $5; Mesaba Bessemer, $4.75; Old Range Non-Bessemer, $4.25; Mesaba Non-Bessemer, $4; Siliceous Bessemer, $2.75; Siliceous Non-Bessemer, $2.35 to $2.60.

Pig Iron.—All the furnaces in this district are so well sold out for the last half that none of them are anxious to make any further sales at present, preferring to wait and sell their Iron for spot shipment should the furnaces turn out their expected output and permit them to dispose of a little additional tonnage later. Quite a number of inquiries have been made for Foundry Iron for last half delivery. One furnace reports a few small sales at $24.50, Cleveland, for No. 2 Northern Foundry, for last half delivery. In view of the existing conditions the market remains very strong, and prices are firm, although no advance from last week's figures is noted. Northern Foundry No. 2 is quoted at $25 at furnace, for third quarter delivery, $24 for the fourth quarter, and $24.50 for the last half. Some quite large consumers of Foundry Iron who have not yet covered for the last half have not yet entered the market, and furnacemen predict that they will have a great deal of trouble in finding Iron. No further sales of Foundry Iron for the first half of 1908 delivery are reported, and furnacemen do not care to make contracts for so far ahead. The Basic Iron situation is very strong. The furnaces are practically out of the market for the year, but many inquiries are still coming in, and one heavy consumer is reported not to have covered for the last half. Basic is quoted at $23.50, Valley furnace, for third quarter delivery, and $23 for fourth quarter. An occasional sale of British Iron is still being made at $26 for No. 3 Middlesbrough, delivered, for quick delivery, but dealers report that they have but little foreign Iron left for sale. Quotations for the last half of 1907, f.o.b. Cleveland, are as follows:

Bessemer	$23.00
Northern Foundry, No. 1	$24.50 to 25.00
Northern Foundry, No. 2	24.00 to 24.50
Northern Foundry, No. 3	23.50 to 24.00
Southern Foundry, No. 2	24.35
Gray Forge	23.00

Coke.—There is a fair demand for Foundry Coke. Dealers are getting from $3.15 to $3.35, both for prompt shipment and on contract. There is no demand for Furnace Coke, which is held at $2.50, at oven. The furnaces seem to be holding back for lower prices.

Finished Iron and Steel.—New business in Billets, Steel Bars and Plates has been very heavy, and specifications on old contracts have come in in good shape. A fair amount of new business in Structural Material has been placed on the books, although some of the mills report that the demand is not so heavy as it was a few weeks ago. Large consumers of Billets have been buying extensively, one mill reporting the sale of several thousand tons during the week. The buying of Steel Bars by the implement makers for their next year's requirements has been much heavier than during the previous few weeks, all sales being made on the basis of 1.60c., Pittsburgh. Many other manufacturers who are large consumers of Steel Bars have also covered during the week for the last half of the year, and some of them for the first half of 1908. The Steel Bar situation, as far as quick deliveries are concerned, is easier, consumers having pretty well anticipated their requirements so that but little premium business is being done. For Steel Bars for delivery in two to four weeks some mills are making small sales at 1.85c., Pittsburgh, but the only orders they are getting are for special sizes, as their price is practically the same as the local warehouse price. In addition to buying Bars the implement makers have placed large orders for specialties during the week. The Bar Iron situation is easy and a fair amount of tonnage has been placed, at 1.70c. to 1.75c., Pittsburgh. The demand for Plates for prompt shipment continues heavy, and mills that are able to make quick deliveries report that they have no trouble in getting a premium of $4 a ton. Outside of Plates very little premium business is being done at present. For future delivery the mills are selling Plates at 1.69½c., Cleveland. The large sales of Billets made during the week were at $30, at mill, for Bessemer Billets, and at $32, at mill, for Open Hearth Billets, for last half delivery. The general condition of deliveries in all kinds of finished material shows no improvement, and Structural deliveries are getting a little tighter. Jobbers have received no notice of an advance in price of Tubular goods by independent mills, and have made no change in price on Merchant Pipe and Boiler Tubes. All warehouse business continues heavy, and none of the prices are changed. Steel Bars are selling at 1.95c. out of stock, and Iron Bars at 2c. Warehouse prices on Sheets are as follows: Blue Annealed, No. 10, 2.30c.; No. 28, One Pass Cold Rolled, 3.05c.; No. 28 Galvanized, 4.15c. The stock price on Boiler Tubes, 2¾ to 5 in., is 64 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 67 per cent. discount.

Old Material.—The demand is good for all kinds of Cast Scrap, and there is a scarcity in the supply. Otherwise the market is dull, and there are practically no inquiries. Prices remain firm, practically the only change noted being a slight advance in Stove Plate, although Cast Borings are a little firmer. No railroad offerings of importance were made during the week. There are no indications of a more active market in the near future. Dealers' prices to the trade per gross ton, f.o.b. Cleveland, are as follows:

Old Steel Rails	$16.75 to $17.00
Old Iron Rails	24.00 to 25.00
Steel Car Axles	22.50 to 23.00
Old Car Wheels	23.00 to 23.50
Relaying Rails, 50 lb. and over	29.00 to 31.00
Relaying Rails, under 50 lb.	31.00 to 32.50
Heavy Melting Steel	16.50 to 17.00
Railroad Malleable	19.00 to 19.50
Agricultural Malleable	15.50
Light Bundled Sheet Scrap	15.50 to 16.50
Bundled Tin Scrap	15.00 to 17.00

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles	$26.00 to $27.00
Cast Borings	10.50 to 11.00
Iron and Steel Turnings and Drillings	12.50 to 13.00
No. 1 Busheling	14.50 to 15.00
No. 1 Railroad Wrought	16.50 to 17.00
No. 1 Cast	18.50 to 19.00
Stove Plate	15.00 to 15.50

(By Telegraph.)

CLEVELAND, OHIO, May 22, 1907.—Pickands, Mather & Co. have sold about 25,000 tons of Malleable Bessemer Pig Iron for delivery during the first and second quarters of 1908 at $22, Valley furnace. There have been a number of other inquiries for Malleable for the first half of 1908 delivery, but the furnaces are not disposed to sell so far ahead. Some small sales of Malleable for the last quarter delivery have been made at $23.75, at furnace.

George H. Lloyd has opened an office at 738 Schofield Building, Cleveland, for the sale of Iron and Steel.

The Standard Connecting Rod Company, Beaver Falls, Pa., has built an addition to its works and is installing machinery which will about double its former output.

New York.

NEW YORK, May 22, 1907.

Pig Iron.—The market has been fairly active, with an undertone of strength. No particularly large blocks of Foundry Iron have been placed, but the buying has been well distributed. There has been further purchasing of Basic Pig, and an aggregate of about 30,000 tons has been booked for delivery during the second half. The Middlesbrough market has eased off somewhat, the latest cable quoting 60s. 3d. We quote spot Northern Iron $25.50 to $26 for No. 1 Foundry, and $24.50 to $24.75 for No. 2 Foundry. For the second quarter we quote $25 to $25.25 for No. 1 Foundry, $23.50 to $24.25 for No. 2 Foundry and $22.75 to $23 for No. 2 Plain. No. 2 Southern Foundry is nominally quoted $26.25 to $26.50 for spot and $23.25 to $23.75 for the third quarter. Middlesbrough is held at $23 to $23.50, ex-ship.

Steel Rails.—Interest centers in the contracting for 1908 delivery. The announcement is made that the Illinois Steel Company has booked a total of about 250,000 tons, which includes the following orders taken during the last week: 65,000 tons to the Northern Pacific, 10,000 tons each to the St. Louis & San Francisco and 4000 tons to the Great Northern. The Tennessee Company has also sold 10,000 tons to the St. Louis & San Francisco road.

Structural Material.—Fabricators report that considerably more estimating is now being done than for some time. Quite a number of extensions to the plants of manufacturing establishments are up for consideration and the work in that direction promises to assume considerable proportions. Some new office buildings are also getting in shape for the letting of contracts for the Steel construction. Among the most important of these are the Lawyers' Title Building, which will take about 2500 tons of Steel, and the American News Building, which will probably need about the same quantity. Railroad work is naturally inclined to quietness in view of the difficulty in raising money from the sale of new securities as well as the rather discouraging outlook for crops. A contract has been placed for a bridge requiring 1400 tons of Steel by the Atlantic Coast Line, and inquiries are in hand for about 10,000 tons from other roads. In the export line nothing heavy is in sight, but some fairly good inquiries are in the market. Structural Shapes are in fair demand, with the mills in position to make deliveries of almost all sizes in four to six weeks. Business in this line, however, is much less than at the corresponding time last year. We quote as follows, on mill shipments, tidewater deliveries: Beams, Channels, Angles and Zees, 1.84½c.; Tees, 1.89½c.; Bulb Angles and Deck Beams, 1.99½c. On Beams 18 to 24 in. and Angles over 6 in. the extra is 0.10c. Sales are made out of stock of material cut to length at 2¼c. to 2½c.

Bars.—The demand for Bar Iron has been somewhat better, with prices apparently maintained at 1.84½c., tidewater. An excellent business is reported in Steel Bars, on which the best delivery promised by leading manufacturers is from three to four months on new orders and about 60 days on specifications on old orders. Freight rates from Pittsburgh to tidewater, New York, will be 16c. per 100 lb. from June 1. Present quotations on Steel Bars range from 1.60c., Pittsburgh, or 1.74½c., tidewater, on long delivery, to 1.84½c., tidewater, or higher on new orders for early delivery. The smaller Steel companies are taking some business at the premium prices.

Plates.—The Eastern mills are taking a considerable quantity of local business in small lots for quick delivery. On work of this kind much better prices are being obtained than on contracts for large lots for future delivery, which would involve competition with Pittsburgh mills. The Eastern Plate mills are still well supplied with work, much of which is, of course, being received from other than seaboard sources. Quotations for tidewater delivery are as follows: Sheared Tank Plates, 1.84½c. to 1.94½c.; Flange Plates, 1.94½c. to 2.04½c.; Marine Plates, 2.24½c. to 2.34½c.; Fire Box Plates, 2.75c. to 3.50c., according to specifications.

Cast Iron Pipe.—Some good business has been placed, and more is in prospect. The leading interest has secured a Buffalo order for about 8000 tons of 16 to 30 in. The city of New York is opening bids to-day on about 3100 tons of 12 to 36 in. The city of Oswego, N. Y., will shortly open bids on 2300 tons of 10 to 24 in. A water company in this vicinity is asking for bids on 1850 tons, and another is getting prices on 1500 tons. Numerous smaller orders are in the market. The general demand, however, is below the average of the season, and there is a dearth of business on 48 to 60 in. The foundries are full of work for a considerable time, some being sold ahead for six months, while those having the smallest quantity of business on hand are full for at least three months. A peculiarity of the situation is that gas companies have so far been buying but little for this season. Pipe manufacturers state that they have never known these companies to purchase so little as they have done this year, as they are only buying for actual necessities, and not making any important extensions. It is surmised that this may be due to the unfavorable attitude of the lawmaking bodies toward public service corporations. Prices are strong, quotations being continued on the basis of $37 to $38 per net ton, tidewater, for carload lots of 6 in.

Old Material.—The market is strong, particularly on Heavy Melting Steel Scrap, Cast Borings and Heavy Turnings. Wrought Scrap is also doing considerably better. The demand for Old Steel Rails for rerolling is much heavier than it has been, the offerings of the railroads being taken quickly, while inquiries are much more numerous. The pressure for deliveries of Heavy Melting Steel Scrap appears to grow stronger instead of diminishing. The consumption of Foundry stock is either less than it has been or the foundries are getting better deliveries of Pig Iron, as the demand for Cast Scrap has latterly been somewhat lighter, although not sufficiently so to cause any recession in price. The situation generally appears to be fully as strong as at any time during the past month. Quotations per gross ton, f.o.b. New York, are as follows:

Old Girder and T-Rails for Melting	$16.00 to $16.50
Heavy Melting Steel Scrap	16.00 to 16.50
Old Steel Rails, rerolling lengths	18.50 to 19.25
Relaying Rails	27.00 to 28.00
Old Iron Rails	24.00 to 24.50
Standard Hammered Iron Car Axles	29.00 to 29.50
Old Steel Car Axles	20.50 to 21.00
No. 1 Railroad Wrought	19.00 to 19.50
Iron Track Scrap	17.50 to 18.00
No. 1 Yard Wrought, long	17.50 to 18.00
No. 1 Yard Wrought, short	17.00 to 17.50
Wrought Pipe	14.50 to 15.00
Light Iron	11.00 to 11.50
Cast Borings	12.50 to 13.00
Wrought Turnings	14.50 to 15.00
Old Car Wheels	23.00 to 23.50
No. 1 Heavy Cast, broken up	19.00 to 20.00
Stove Plate	16.00 to 16.50
Grate Bars	14.00 to 14.50
Malleable Cast	20.00 to 20.50

Metal Market.

NEW YORK, May 22, 1907.

Pig Tin.—An erratic market, with wide variations in price, even on the same day, has marked the course of events in the Tin Trade. There has not been what could be called a good day in a week, the largest turn over for any one being about 50 or 60 tons. The shortage of Tin is being felt more and more, and it continues to excite comment why London holders are not sending more Tin to this country, as there are now only about 50 tons of spot Tin in New York, and some of that is not for sale. Practically every trade is a separate transaction, as on May 15 sales were made at 43.50c. and 43.75c. On the following day the market ruled higher at 43.75c. to 44c. The premium was reduced, as the Minnehaha began to deliver Tin on May 17, and some was sold at 43c., ex-ship. It was found later that most of this Tin had been sold and resold, and was practically in consumers' hands by the time it was out of the ship, so there was little available to sell, and the price moved up sharply until May 21, when there was a wide variation in quotations, some Tin having been bought as low as 43.50c., while other sales were made at 44c. On the same day Tin, ex-Celtic, which is due May 26, was sold at 42.25c. to 42.75c., showing the high premium for spot delivery. In the minds of old dealers Tin has never been as scarce as it is now. The arrivals have been very light, amounting to but 1492 tons, and there are afloat for American ports 2353 tons. Of the amount afloat over 1400 tons will not make this month's delivery. The strike of the longshoremen is, of course, the cause of the high premiums, and the Muncaster Castle, which had 400 tons aboard, is now lying at her dock in Brooklyn, having discharged but 100 tons. Some Tin is being shipped to Philadelphia, which will be controlled by New York parties. At least 125 tons are known to have been shipped for that port, and it is easily possible that considerably more may have been sent on the same vessels. The London market is relatively firm, closing to-day at £189 10s. for spot, and £185 for futures. Tin can be had to-day at 43.75c.

Copper.—Offerings of refined Copper are being made more freely, but resultant business is small, although concessions have been made since last week, and European consumers will need more copper for June delivery. Practically all sellers are urging sales, and while the leading selling interest of Electrolytic Copper is not making as attractive quotations as some others rumor has it that concessions may be made shortly. In the absence of business from domestic consumers quotations continue more or less nominal, at 24.62½c. to 25c., for Lake; 23.75c. to 24.25c. for Electrolytic and 22.50c. to 23.25c. for Casting Grades. It seems more than probable that producers will seek first to supply European melters with sufficient material for some time ahead, even if it has to be done at concessions, and when the price for export is thus established the long deadlock between producers and buyers in this country will be broken. Over a month ago we pointed out that consumers of Wire Bars were requesting delays in deliveries, and it has recently transpired that some consumers are now offering to

resell Copper purchased earlier. This may in a large measure account for their postponement of buying for July and later deliveries, as the time has long since passed when such Copper would be bought under normal conditions. Sellers of small lots have no complaint regarding trade, as there is an increase in the hand to mouth buying. Prices for small lots are firm, and in fact are moving in an opposite direction to carload lot prices. The London market is active, closing at £101 10s. for spot, and £98 10s. for futures, while Best Selected is held at £111 10s. The exports are light, amounting to 6000 tons so far this month, while the imports are over 4000 tons.

Lead.—The market is exceedingly dull, and business during the month of May so far has been light. While there have been no lower quotations made, still it is offered more freely, and the leading interest is making marked headway in the matter of catching up with delayed deliveries. Prompt shipments can be had in New York at 6c. to 6.05c. In St. Louis the asking price is 5.92½c., but a firm offer at 5.90c. might be considered.

Spelter.—Prices are again easy and business is light. In St. Louis Spelter can be had at 6.35c., and the price in New York ranges from 6.45c. to 6.50c.

Antimony.—Heavy importations of antimonial lead, combined with exceedingly large stocks of Antimony in this country, are making it almost impossible to sell the metal even at much reduced quotations. Hallett's can be had at 17c. to 18c., and sales have been made within these limits; Cookson's at 20c. to 21c., while outside brands are as low as 16½c. Buyers apparently have no confidence even in these prices.

Ferroalloys.—There are a number of inquiries for future deliveries of Ferrosilicon in the market, aggregating 500 tons, and the price continues unchanged, at $104 for future deliveries of 50 per cent. Spot stocks command a premium, and are held at $108 to $110. Ferromanganese is dull and slightly lower, although an inquiry for a large amount is in the market. Prompt shipment can be had at $67 to $69, and future deliveries at $64 to $66.

Tin Plates.—The market is firm, and prices are unchanged at $3.90, f.o.b. Pittsburgh, and $4.09, f.o.b. New York, for 100-lb. IC Coke Plates, subject to the usual discount for quantity.

Old Metals.—Trade is light, and dealers' selling prices are easier, as follows:

	Cents.
Copper, Heavy and Crucible	22.00 to 22.25
Copper, Heavy and Wire	21.75 to 22.00
Copper, Light and Bottoms	19.75 to 20.25
Brass, Heavy	15.25 to 15.75
Heavy Machine Composition	19.25 to 19.75
Clean Brass Turnings	13.75 to 14.00
Composition Turnings	16.75 to 17.00
Lead, Heavy	5.50 to 5.75
Lead, Tea	5.25 to 5.45
Zinc Scrap	5.25

Iron and Industrial Stocks.

NEW YORK, May 21, 1907.

The stock market has been adversely affected by the unseasonable conditions affecting the progress of the crops, as well as by the attitude of the national Administration with respect to some of the large corporations. Liquidation has been heavy and prices have gone off considerably since the report was prepared for last week's issue. From Thursday of last week to Tuesday of this week United States Steel common has receded from 36⅝ to 31⅞, preferred from 100⅛ to 97⅜; Car & Foundry common from 37⅛ to 34½, preferred from 100⅛ to 99; Locomotive common from 61½ to 57⅝; Cambria Steel from 38⅛ to 36¾; Colorado Fuel from 33¾ to 27½; Pressed Steel common from 35 to 30⅛; Railway Spring common from 44 to 40½; Republic common from 26½ to 23, preferred from 85⅞ to 81; Sloss-Sheffield common from 61 to 53; Tennessee Coal from 146¾ to 138½; United States Cast Iron Pipe common from 35½ to 32½, preferred from 84 to 81; Can preferred from 55 to 54. The only transactions in Steel Foundries preferred during the period named occurred at 35½. Last transactions up to 1.30 p. m. to-day are reported at the following prices: United States Steel common 33, preferred 97⅞; Car & Foundry common 35, preferred 98⅞; Locomotive common 58¼, preferred 106; Steel Foundries common 5¾, preferred 35½; Colorado Fuel 28½; Pressed Steel common 31½, preferred 91; Railway Spring common 40¼; Republic common 23¾, preferred 82; Sloss-Sheffield common 54; Tennessee Coal 137½; Cast Iron Pipe common 32½, preferred 81; Can common 5½, preferred 54.

Announcement is made that the Midvale Steel Company, Philadelphia, proposes to make a radical readjustment of its capital, increasing it from $750,000 to $9,750,000. The formal ratification of this decision will be given at the meeting of the stockholders on July 18. Following the policy of sustaining a reserve, a method that has been observed by the company since its organization in 1881, the corporation now has a surplus of $10,000,000, and as there is no bonded debt to make an interest fund necessary, this will be issued as stock, instead of being paid out in dividends, thus providing the capital and giving a financial prospectus that will enable the company to seek contracts from foreign governments.

The General Electric Company, Schenectady, N. Y., announces that stockholders of record June 20 will be permitted to subscribe at par until July 20 to the extent of 20 per cent. of their respective holdings, for an issue of $13,000,000 10-year 5 per cent. debenture bonds, convertible after June 1, 1911, into the stock of the company at par, and redeemable after that date at 105, subject, however, to the stockholders' right of conversion. Subscriptions will be payable 50 per cent. on July 20, 1907, and 50 per cent. on January 20, 1808, or optionally in full on the first date mentioned, whereupon bonds, or negotiable receipts therefor, will be delivered. The proceeds will be used for additional working capital.

The Garland Corporation is offering through the First National Bank of Pittsburgh and H. P. Taylor & Co. of Pittsburgh $500,000 of first collateral trust sinking fund 5 per cent. gold bonds at 95 and interest, $1,000,000 of such bonds having been already sold. The security is all the shares of the Garland Nut & Rivet Company, 1420 out of 1430 shares of Woodhouse, Bopp & Co., silk manufacturers; 4025 out of 5000 shares of the Safety Armorite Conduit Company, and all of the 20,000 shares of the West Pittsburgh Realty Company. W. C. Lymer, Son & Co., accountants, report that the gross assets of the concerns named are $3,258,302.83, from which should be deducted current liabilities, not due, of $153,684.63, leaving net assets of $3,104,618.20, which does not include the patents owned by the different corporations. The net manufacturing earnings of the combined companies were $148,076.39 in 1904, $185,118.04 in 1905 and $259,028.24 in 1906.

Dividends.—The National Lead Company has declared a quarterly dividend of 1¼ per cent. on the common stock, payable July 1, an increase of one-quarter of 1 per cent. over the last quarterly dividend. The regular quarterly dividend of 1¾ per cent. on the preferred stock is payable June 15.

The National Enameling & Stamping Company has declared a quarterly dividend of 1¾ per cent. on the preferred stock.

The Pittsburgh Valve, Foundry & Construction Company, Pittsburgh, has declared a quarterly dividend of 1¼ per cent., payable June 1.

The Sloss-Sheffield Steel & Iron Company has declared a quarterly dividend of 1¼ per cent. on the common stock, payable June 1.

The Standard Chain Company has declared a quarterly dividend of 1¾ per cent. on the preferred stock, payable June 15.

The Barney & Smith Car Company has declared a quarterly dividend of 1 per cent. on the common and 2 per cent. on the preferred stock, payable June 1.

The Republic Iron & Steel Company has declared the regular quarterly dividend of 1¾ per cent., and an extra dividend of 2 per cent. on the preferred stock, payable July 1. The declaration of the 2 per cent. extra dividend wipes out the last of the arrears on the company's accumulative preferred stock.

Gould Pumps Shown at the Cotton Convention.

The Goulds Mfg. Company, Seneca Falls, N. Y., at the exposition in connection with the meeting of the American Cotton Manufacturers' Association, held in Philadelphia, May 13 to 18, displayed three styles of its several makes of pumps, including one single acting triplex plunger pump, for tank pumping in mills, bleacheries, tanneries, refineries, dye houses, &c. These triplex pumps are made in a wide range of sizes, the style shown at Philadelphia being built with capacity from 108 to 16,580 gal. per hour, for 150-lb. pressure or 350 ft. elevation. It has three cylinders, in each of which a plunger or piston operates. These plungers, or pistons, are actuated by connecting rods from the crankshaft. The crankshaft has three cranks, equally spaced 120 degrees apart in the circle of rotation. This construction causes the strokes to follow and overlap each other, resulting in an extremely uniform hydraulic flow, uniform expenditure of power and a consequent smooth operation of the mechanical parts. The power is so constantly applied to the column of moving fluid that an even flow and high efficiency are obtained. A modern centrifugal pump was exhibited, as well as one of the company's Pyramid double acting force pumps, used largely for small pumping in textile mills, general water supply and tank pumping. It is built for 54 lb. pressure, or 125 ft. elevation.

Labor Notes.

It is stated that the union molders of Philadelphia, who have carried on a strike since October, 1905, against the Philadelphia foundries belonging to the National Founders' Association, have received notice from their national officers that strike benefits will be discontinued after June 1, 1907. The foundries affected have been operated as open shops since the beginning of the strike.

The Massachusetts Bureau of Statistics of Labor, in presenting labor and industrial chronology for that State for the year ending September 30, 1906, says that progress has been made in shortening the work day, the nine-hour day being substituted for the 10-hour and the eight-hour for the nine-hour day. The weekly half-holiday during the summer months has become general in the various industries and trades. The early-closing movement met with more generous response from employers than formerly. Massachusetts has participated in the remarkable increases in wages which have taken place throughout the United States during the year. The most pronounced increases have been in the transportation and the textile industries.

Union molders in Detroit, Mich., to the number of 750 struck on May 13 for a reduction in hours from 10 to nine. The local organization had also decided to ask for an increase in the minimum wage rate, but the national officers of the union would not permit this demand to be made. The foundrymen refused to confer with representatives of the union, but stated that they would willingly confer with their own employees. Seven jobbing foundries, employing about 250 of the 750 strikers, have granted the reduced hours. Apart from the 500 men who are still out, 1500 molders are employed by Detroit foundries which are still running 10 hours a day, the union having little strength in these plants.

The union molders of Dayton, Ohio, recently demanded an increase in the minimum wage rate, a reduction in hours from 10 to nine and an advance of 10 per cent. to piece workers. The foundrymen of Dayton have refused for a number of years to hold conferences with representatives of the union and this attitude was maintained respecting this last demand. The union called out on strike about 250 molders and core makers from eight foundries. In nine other foundries employing about 350 molders and core makers the union did not have strength enough to declare a strike. Twelve Dayton foundry firms have adopted the following declaration: "That the foundrymen whose names are hereto attached will continue to conduct their foundries or will in the future conduct their foundries as open shops; that our workmen who remain at work and those who enter our employment to fill vacancies will not be discharged on any demand of the union, or so long as their services are such as to merit their continued employment without any regard to membership or nonmembership in the union." The above is signed by the following firms: Dayton Globe Iron Works Company, Kramer Bros. Foundry Company, Platt Iron Works Company, Brownell Company, Ohio Foundry Company, Seybold Machine Company, Joyce-Cridland Company, Buckeye Iron & Brass Works, New Era Gas Engine Company, Advance Foundry Company, Eureka Foundry Company, Davis Sewing Machine Company.

Press dispatches state that the machinists employed by the Kitson Machine Company, Lowell, Mass., manufacturer of textile machinery, have struck for an advance in wages, following what they claim to be reduction in bounty upon machines built, under the company's system of wages. Some 300 men went out May 21.

The car workers, machinists and blacksmiths of the New York, New Haven & Hartford Railroad have asked for an advance in wages of 10 per cent.

A recent strike of the union machinists in the brass and machine shops of the N. O. Nelson Mfg. Company's co-operative plant at Le Claire, Ill., resulting in a walkout of 100 machinists, presents the novel spectacle of men striking against their own management. An increase in wages of 10 per cent. is demanded. According to the statement of N. O. Nelson, president, a large portion of the stock is held by employees and customers, and the workers at Le Claire as well as at other plants owned by the company are practically self employing. Last year they received a stock dividend of 25 per cent., on which a cash dividend of 6 per cent. was paid. The present trouble is attributed by Mr. Nelson to the interference of labor unions, which, though serving a useful purpose in industrial affairs, have no place in an institution conducted by and for its own employees.

New Publication.

American Pattern Shop Practice.—By H. J. McCaslin. No. 1 of the Frontier Series, edited by H. M. Lane. Publisher: The Frontier Company, Cleveland, Ohio. Size, 6 x 9 in. Pages, 282. Illustrations, 350. Price, $3.

The author, who is superintendent of a large pattern shop connected with both gray iron and steel foundries, has written many articles for machinery, patternmaking and foundry journals. These have been gathered together and other matter added to form the present volume. Not a little has already been published concerning patternmaking, but the author considers that there is yet one field not pre-empted, the distinctive feature of his book being its treatment of molding and coremaking alongside of patternmaking. In view of the necessity for thorough co-operation between the foundry, the pattern shop and the coreroom, such a presentation of patternmaking problems as Mr. McCaslin has undertaken should have a wide reading. The book contains six sections and each section has its own paging. This, it is explained, is to facilitate revision for future editions. The convenience of such an arrangement to the publisher is obvious, but for the reader the difficulty of reference to a particular subject is rather increased by the fact that after each page numeral is a Roman numeral indicating the section. Section I is devoted to engine patterns; Section II to molding and cores; Section III to sweep work; Section IV to gearing, and Section V to representative patterns, while Section VI is given up to hints, suggestions, tables and illustrations of various rigs.

One might have looked in a volume which particularly emphasizes the connection between the foundry and the pattern shop for a treatment of the pattern equipment of molding machines. However, this subject is probably reserved for a volume on foundry practice, which the same publisher will soon bring out. Section II, dealing with molding and cores, will be found of special value from the average patternmaker's standpoint, while the superintendent and foreman dealing especially with large work will find other sections more helpful. In connection with molding, the gating of the mold is gone into in a number of instances. The style of mold used in connection with the type of pattern adopted is also referred to. A feature of value is the description of a method of producing core boxes or patterns for duplicate work by the use of plaster of Paris patterns, the process being similar to that of reverse molding. Section IV is inserted apparently on the theory that no work of this sort is complete without treating more or less at length on gearing. Yet the author has made this section the shortest in the book, wisely choosing to elaborate on less hackneyed subjects. Section V, dealing with representative patterns, includes instructions as to the making of patterns for a throttle valve body, pinion housing, hawser pipe, nozzle, steel truck bolster, cylinder, Chilian mill mortar and a crooked elbow. The descriptions throughout the work are clear and there has been no stinting of illustrations. The Frontier Company has put out an excellent work at the start, and if the standard thus set is maintained should find an appreciative response from the buyers of practical shop literature.

The Babcock & Wilcox Company, Farmers Bank Building, Pittsburgh, has received an order for 800-hp. Stirling water tube boilers from the Kittanning Plate Glass Company, Kittanning, Pa.

Trade Publications.

Machinery and Tools.—The Brown & Sharpe Mfg. Company, Providence, R. I. Catalogue for 1907. Size 4 x 6 in.; pages 499. Like its predecessors this is a handbook as well as a very complete exposition of the company's extended line of machinery, cutters, small tools and other products, including a number of new machines and tools. A detailed index facilitates ready reference. Several lines of machine tools are shown in their various sizes and types, with the numerous fixtures that accompany them, such as universal and plain milling machines; universal plain and surface grinding machines, and grinders for cutters, tools and reamers; automatic gear cutting machines; plain, wire feed and automatic screw machines; turret forming machines and cutting-off machines; universal hand lathe, polishing and finishing machine and screw slotting machines; annealing and case hardening furnaces and soda kettles; air pumps; friction pulleys, &c. The line of standard cutters is well known and very extended. The same is true of the various types of gauges, micrometers, straight edges, calipers and other machinists' tools. Miscellaneous machinery, foreign to the metal trades, as sewing machines, clippers and appliances for use in yarn mills, are also covered. Two pamphlets are also being distributed. One is confined to high speed steel cutters, made from the Brown & Sharpe high speed steel, it being a section of the general 1907 catalogue. The other deals with standard cutters, and is also taken from the catalogue.

Souvenir.—A. Leschen & Sons Rope Company, St. Louis, Mo. Album. Entitled "St. Louis To-day." Size 9 x 12 in.; pages 96. This booklet, published under the auspices of the Business Men's League of St. Louis, was prepared in the interests of that city to spread a knowledge of its present attractions, commercially and socially, and the inducements it affords to the location of business interests there. The history of the city is briefly sketched and much space is given to descriptions of its educational, industrial and residential advantages. The booklet is mainly composed of views of the most important municipal, office and school and college buildings, stores, parks and manufacturing plants. Among the latter are two views of the works of the A. Leschen & Sons Rope Company, which is described as the largest wire rope factory in the West.

Contract Book.—Goheen Mfg. Company, Canton, Ohio. Zevy's Engineers' Contract Book. Size 18 x 23 in. The company is distributing this book gratis to engineers who may find it useful. It contains large sheets with blanks for the preservation of data in connection with contracts for street, sewer and sidewalk work, water works equipment, electric light, power and street railroad equipment, and buildings, on which the details of estimates from contracts may be itemized. The reverse sides of the sheets give sample specifications for the painting of exposed steel and metal work for its preservation, and fly leaves refer to the company's products—oxidized carbon cement for filling pittings and protecting the surface of steel work exposed to water or air; Galvanum, for protecting galvanized iron; Old Honesty paint, for outdoor work, and Carbonizing Coating, an iron and steel protector. Numerous illustrations show work on which the various materials have been used.

Fireproof Materials.—Wendell & MacDuffie, 26 Cortlandt street, New York City. Catalogue No. 16 and supplement. Describes the company's asbestos and cement fireproof materials, the line including reinforced asbestos corrugated sheathing, a composition of asbestos and cement compressed under pressure and reinforced with ¾-in. woven wire mesh, this material being used as a substitute for corrugated iron. The asbestos building lumber, which is used to a great extent for construction work in electrical plants of all kinds for insulators, door panels, telephone switchboards, barriers, cable flue partitions, &c., is described, and also Century asbestos shingles, which are made in various colors and tabulated according to size, the numbers, weights, gauges and prices being given. The supplement gives drawings and dimensions of the different size slates and describes the various methods of laying.

Builders' Iron Work, Fire Escapes, &c.—Taylor & Dean, 201 Market street, Pittsburgh, Pa. Catalogue No. 75. Size 9 x 12 in.; pages 40. Devoted to completed ornamental iron, wire and brass work, such as balconies, fire escapes, fireproof porches, electroliers, lamps, interior grill work for banks, offices and residences, elevator inclosures, ornamental entrance gates, &c. Illustrations show residences, offices, stores, &c., equipped with the above named products.

Roller Bearings.—Geo. A. McKeel & Co., Limited, Jackson, Mich. Catalogues. No. 9 pertains to Peninsular self-oiling roller bearings, giving illustrations, descriptions and dimensions and dimensions of roller bearing double braced drop hangers, post hangers and pillow blocks. Results of tests and a partial list of customers are included. The other catalogue contains reproductions of testimonial letters.

Gas Producers.—Wellman-Seaver-Morgan Company, Cleveland, Ohio. Circular No. GP-1. Size 6 x 9 in.; pages 32. Illustrates and describes the Hughes continuous gas producers. The mechanically poked type, which was described in *The Iron Age* November 22, 1906, is claimed to have an average capacity of 25 lb. of coal per hour per square foot of producer area, and frequently 30 lb. per square foot may be gasified for long intervals. The nominal capacity for the standard size of mechanically poked producer, which is 10 ft. in diameter inside of the firebrick lining, is 1 ton of coal per hour. Other types of producers dealt with are the self-cleaning continuous gas producer, which mechanically disposes of the ashes and clinkers from under the water seal, and the hand-poked continuous gas producers, for use in plants where the gasifying capacity required is less than would require the mechanical poked type. The latter part of the catalogue contains drawings and descriptions of eight typical arrangements for gas producer plants with Hughes continuous gas producers.

Electric Heating and Cooking.—General Electric Company, Schenectady, N. Y. Catalogue and price-list. Catalogue No. 4471. Size 8 x 10½ in.; pages 24. Deals with the company's electric heating and cooking apparatus, including electric flatirons, combination liquid heaters, coffee percolators, chafing dishes, tea kettles, disk stoves, grids and boilers, frying pans, baking ovens, cigar lighters, heating pads, glue pots, luminous radiators and nonluminous air heaters. Price-list No. 5158, of electric heating devices, supersedes the prices in catalogues No. 4471 and price-list No. 5147.

Electric Propeller Fans.—B. F. Sturtevant Company, Boston, Mass. Bulletin 146. Illustrates and describes electric propeller fans, built in sizes from 18 to 120 in., and carried in stock in sizes up to 48 in., wound for 110 and 220 volts. Both fans and motors are manufactured by the company. The motors are dust proof and the fans may be placed in any location and controlled by switch from a distance.

Lever and Vertical Shears.—United Engineering & Foundry Company, Pittsburgh, Pa. Pamphlet. Pertains to the company's lever and vertical shears, giving a list of users and a few copies of testimonial letters. These shears are in use in scrap yards and rolling mills throughout the country and are built in various sizes, with either belt, engine or motor drive and with different lengths of knives to suit conditions.

Metal Shop and Factory Fixtures.—Manufacturing Equipment & Engineering Company, 209 Washington street, Boston, Mass. Pamphlet. Gives an illustrated description of the company's metal shop and factory sanitary and fireproof equipment and specialties, including individual wash bowls arranged in batteries, thermostatic controlling appliances, cylindrical lockers, soda and potash ketties with and without thermostats, shop and factory stools, work benches, storage racks, steel boxes and trays, and standard bench legs. A list of users is appended.

Drilling and Tapping Machines.—Cincinnati Machine Tool Company, Spring Grove avenue and Township street, Cincinnati, Ohio. 1907 catalogue. Size 6 x 9 in.; pages 48. Illustrates and describes the Cincinnati upright drilling and tapping machines, which constitute the company's exclusive specialty. Special attention is called to the patent geared tapping attachment, by the use of which the spindle can be driven in either direction and will handle right or left hand taps equally well, and also to the patent positive geared feed with quick change gear box, furnished on the 24, 28, 32, 36 and 42 in. drills. Among accessories and fixtures referred to are an independent compound table, a high speed attachment, drill press vise, drilling plates, steel sockets and sleeves for taper shank drills, drill chucks and patent increase twist drills.

Nut and Bolt Fasteners.—American Nut & Bolt Fastener Company, Pittsburgh, Pa. Pamphlet. Pertains to the Bartley nut and bolt fasteners, especially adapted for fastening nuts and bolts on cars, electric motors, rails and all parts of machinery where nuts and bolts are liable to become loose from vibration, jarring and other causes.

Asbestos Building Materials.—Asbestos, Shingle, Slate & Sheathing Company, Ambler, Pa., Keasbey & Mattison Company, Ambler, Pa., selling and distributing agents. Pamphlet. Size 3½ x 6 in.; pages 64. Gives prices of asbestos Century shingles or roofing slates, asbestos Century sheathing or building lumber, and reinforced asbestos corrugated sheathing. The various methods of applying the roofing slates are shown, and also how the building lumber may be used to advantage in building portable fireproof shelters, automobile houses, &c. These products are claimed to be waterproof, everlasting and fireproof.

Oil Purifiers and Water Strainers.—Liberty Mfg. Company, 6910 Susquehanna street, Pittsburgh, Pa. Circulars. One pertains to the Liberty lubricating system, with special reference to the Liberty-Famous oil purifier, which is suitable for any kind of automatic oiling or direct return system, and is specially adapted to the company's automatic lubricating system for oiling the bearings in large or small power plants. The other circular deals with the Liberty twin strainer for removing all kinds of foreign matter from the water supply, and may be used on injector lines, boiler feed lines, jet condensers, &c., where it is necessary to strain a liquid continuously.

Engines.—Hooven, Owens, Rentschler Company, Hamilton, Ohio. Bulletin No. 101. Contains an illustrated description of the type H. S. high speed Hamilton Corliss engines with positive driven valve gear and shaft governor.

The Machinery Trade.

NEW YORK, May 22, 1907.

The demand for machinery the past week was not so active, compared with that of the previous weeks, there being a noticeable decrease in the number of inquiries received. These covered small lots of tools, with few exceptions, but no good sized lists were reported. As a great majority of the machine tool houses are booked ahead so far the slight recession in business is causing little concern, and in some quarters is even acceptable, because of the opportunity it affords them to catch up on deliveries. While business holds up well, and at the present time no bad symptoms have developed, some uneasiness is felt in certain branches of the trade concerning the near future. New projects are not nearly so numerous as they were a short time ago, and new construction work has fallen off perceptibly. As a consequence the business in sight from those sources is not very encouraging. It is thought, however, that the business that has been held back because of extended deliveries and high prices will be placed as soon as these ease up, and that it will be of sufficient volume to fill the gap made by any recession in building operations. From the West a 5 per cent. advance in prices in some special machines is reported, but it is not believed that an increase in machine tool prices is imminent as long as raw materials remain at the present prices. It is quite certain that the present quotations on machine tools will prevail for some time to come, unless manufacturers, in covering their requirements of iron and steel, are forced to pay higher prices, in which event a corresponding increase in prices of tools will probably be made.

A representative of a German exporting firm is authority for the statement that even had the tariff rates on machine tools exported from this country to Germany been reduced by the recent agreement between the two countries, business could hardly have been helped as far as orders are concerned, for notwithstanding the prevailing high prices for machine tools in this country the demand from Germany, in some lines especially, is hard to fill. It is declared that orders are being taken for delivery from four to six months from date, and the great problem before the exporters is to get machinery to fill orders. The complaint is also made that they suffer from frequent disappointments because manufacturers wish to please their customers in this country in preference to their export trade, and it is only in rare instances that purchasers are able to get a penalty clause inserted in an agreement to deliver machinery.

In another part of this issue will be found the report of the second day's proceedings of the National Machine Tool Builders' Association. Taken in conjunction with our report printed on page 1517 of last week's issue it will be noted that the Old Point Comfort meeting of this organizateion was a most successful one. The topics brought up for discussion were timely, and the thorough manner in which the members debated them was a manifestation of keen interest. The progress made along the lines of uniform cost accounting and the adoption of the suggestions contained in the report of the Committee on Apprenticeship, were the most important accomplishments of the meeting.

Machinery Club Officers Elected.

At a meeting held last Friday, at the office of the Watson-Stillman Company, in the Havemeyer Building, the Board of Directors elected by the general committee appointed to form the Machinery Club in New York created a permanent organization by formally accepting the charter under which the club was incorporated, and adopted the by-laws formulated by a special committee and presented at a previous meeting of the general committee. The organization of the club was begun by appointing Henry Prentiss of the Prentiss Tool & Supply Company; W. P. Pressinger, Chicago Pneumatic Tool Company, and Otis H. Cutler, American Brake Shoe & Foundry Company, as a Nominating Committee to present the names of officers for the club. The committee recommended the following officers, who were elected by acclamation: F. H. Stillman, as president; R. C. McKinney of the Niles-Bement-Pond Company, vice-president; Walter L. Pierce, Lidgerwood Mfg. Company, treasurer, and Theodore Waters, Hudson Companies, secretary pro tem. The committee next accepted the resignation of John Derby as a member of the Board of Governors, and J. R. Vandyck of the Vandyck-Churchill Company, was elected in his place. The names of all present were then placed in a receptacle, from which they were drawn singly, to decide on the first Governing Committee for the club, the result being as follows: For one year: Foster Milliken of Milliken Bros.; O. C. Gayley, Pressed Steel Car Company; John W. Dunn, International Steam Pump Company; George A. Post, Standard Copper Company, and Walter L. Pierce; two years, F. H. Stillman, H. C. Hunter, R. C. McKinney, James B. Brady of the Standard Steel Car Company, and J. W. Duntley of the Chicago Pneumatic Tool Company; three years, Thornton N. Motley, T. N. Motley & Co.; Henry Prentiss, J. R. Vandyck, John R. McGinley, Duff Mfg. Company; four years, A. B. See, A. B. See Electric Company; W. H. Marshall, American Locomotive Company; Arthur L. Merriam, Ames Iron Works; E. H. Wells, Babcock & Wilcox Company, and W. L. Saunders, Ingersoll-Rand Company. Mr. Vandyck was made chairman of the Membership Committee, and Mr. Motley chairman of the House Committee, with the provision that the rest of the members be appointed from the organization. The three executive officers of the club were appointed a committee to confer with the Hudson Companies, with a view to engaging quarters on the upper floor of the Hudson Companies' Terminal Building, when it is completed. The next meeting of the Board of Governors will be held at the Lawyers' Club, at the call of the president, at which time provision will be made for receiving into membership the 400 or more applicants whose names have been enrolled as favoring the organization of the club.

Orders have been recently placed by the Seaboard Air Line for equipment for its new shops at Jacksonville, Fla. The company issued a list covering over 100 tools, and it is understood that a greater portion of this list has been covered.

The Allegheny Valley Malleable Iron Company, 423 Bank of Commerce Building, St. Louis, Mo., has begun the construction of a large malleable iron plant at New Kensington, Pa., which it is expected will be ready for operation by October 15. All communications pertaining to such material as will be necessary for the erection and operation of the foundry should be addressed to A. W. Phelps, manager, New Kensington, Pa.

The High Point Machine Company, High Point, N. C., has secured a site at Ponrona, where it will erect a new foundry, machine shop and wood working shop. The present plant will be moved into the new buildings, and some additional machinery will be installed. At the present time the company has not decided just what new machinery it will require.

B. Maganbhai & Co., engineers, contractors and machinery importers, Bombay, India, are in the market for copper and brass rolling mill equipment for immediate delivery.

The New York Edison Company, 55 Duane street, has filed plans for a transformer station, 40 x 100 ft., to be built at 259 West 153d street, near Ninth avenue, New York. Thomas E. Murray, chief engineer of the Edison Company, has been buying some power equipment of late for the Transit Development Company of Williamsburg, which is connected with the Brooklyn Edison Company. It is understood that the equipment is for one of the Brooklyn Rapid Transit Company's power stations.

Bids will be received by the Commissioner of Water Supply, Gas and Electricity, of the Borough of Brooklyn, on Tuesday, May 28, for installing equipment for generating 1830 kw. of electric power at each of the high pressure fire service pumping stations located in the Borough of Brooklyn, at Furman and Joralemon streets and Willoughby and St. Edwards streets, respectively. Bids will also be taken at the same time for equipment for generating and transmitting 3250 kw. of electric power at each of the high pressure fire service pumping stations located in the Borough of Manhattan, at Oliver and South streets, and at Gansevoort and West streets. Bids on all the requirements should be addressed to John H. O'Brien, Commissioner of Water Supply, Gas and Electricity.

Inquiries are in the market for a 135-hp. engine, with boilers to correspond, for installation in a factory to be built at Emmet street, Newark, N. J., by Schorestene, Picard & Co., manufacturers of furs, 37 West Fourth street, New York.

F. H. Brown, formerly of the Brown & Zortman Machinery Company, Pittsburgh, has organized the F. H. Brown Machinery Company, with offices in room 1102 Park Building, Pittsburgh. The new company will represent in the Pittsburgh District a number of machine tool manufacturers and will make a specialty of buying and selling second-hand machinery. It will also have the sales agency in the Pittsburgh District for the Bradford lathe, which is built in sizes from 14 to 42 in.

Cleveland Machinery Market.

CLEVELAND, OHIO, May 21, 1907.

The demand for machinery shows no falling off, and the amount of orders for machine tools booked during the past week has been very satisfactory to dealers. While no large orders have been placed, the total represents a good aggregate of business. There has been a heavier demand than usual during the week for milling machines. Among other machine tools the largest demand has been for lathes, boring

mills and shapers. Some of the automobile manufacturers have entered the market during the week, and placed orders for machine tool equipment to provide additional facilities for their next season's output. They are asking for deliveries early in the fall, when they begin the manufacture of automobiles for next year. An encouraging sign of business confidence is the fact that many manufacturers are anticipating their future needs, and are placing orders for additional machine tool equipment for delivery at the end of this year or the first of next. The demand for machine tools for quick delivery continues strong, but in only few cases can prompt shipment be made. Many of the machine tool manufacturers seem to be getting further behind with deliveries, and the majority are loaded up with orders for fully six months ahead. One or two makers of special tools, whose plants are far behind with deliveries, have announced an advance in price of about 5 per cent. during the past week. All dealers in machine tools report a large number of inquiries.

The Hocking Valley Railroad is receiving proposals for machinery for its new shops at Logan, Ohio. Contracts have already been made for about all of the woodworking machinery. The contract for the shops will soon be let. The main building will be 162 x 500 ft.

The Phoenix Machine Company has been incorporated in Cleveland by William Howell and others with a capital stock of $10,000. The company has opened a shop at the corner of Winter and Leonard streets, where it will do general machine repair work and engage in manufacturing, the nature of which has no yet been announced.

John McMyler of the McMyler Mfg. Company, who is now on the way home from a trip around the world in the interest of his company, has just cabled from Australia that he had secured contracts for four McMyler car dumpers from Australian railroads.

A company is being formed in Marion, Ohio, with a capital stock of $25,000, for the erection of a plant for the manufacture of gasoline engines. Fred W. Warner and Harry E. Carpenter are promoting the project.

The voters of Monroe, Mich., have authorized a $10,000 bond issue in order to offer bonuses to secure manufacturing enterprises. Of that amount $6000 will be expended to purchase a site for the Craig-Toledo Automobile Company, which will move its plant from Dundee, Mich., to Monroe. The company's present plant is entirely too small for its needs.

The United Engineering & Foundry Company, Youngstown, Ohio, has completed plans for a large addition to its plant. The building will be constructed of brick and steel, and will be three stories high and about 85 x 200 ft.

The International Harvester Company is completely overhauling the old Buckeye reaper and mower plant, Akron, Ohio, which has been idle for several years, and a great deal of new machinery is being installed. The company, it is reported, will use the plant for the manufacture of gasoline traction engines, stationary engines and cheap automobiles.

The Cylinder Safety Valve Company, Mansfield, Ohio, has commenced the erection of a factory building, 42 x 140 ft. The new plant will be completed about September 1.

The Ætna Foundry & Machine Company, Warren, Ohio, will soon begin the erection of a blacksmith shop and storage building. Two new electric cranes are being installed.

Chicago Machinery Market.

CHICAGO, ILL., May 21, 1907.

Following the period of hesitancy that succeeded the sudden and disastrous decline in security values a few weeks ago the market seems to have gathered its former momentum, and is now swinging along with unchecked force. Whatever may be said of the greater caution that is seemingly exercised by dealers and users in contracting for far ahead deliveries, it is certain that the demand for tools and equipment for immediate use is surprisingly large. No better evidence of the willingness of buyers to take spot delivery tools is needed than that furnished by the eagerness with which offerings of second-hand machines are taken and the remarkable prices they bring. A case in point that serves to illustrate the unusual character of this demand is found in the result of an auction sale held last week by the Wisconsin Trust Company, Milwaukee, Wis., trustee in bankruptcy of the Four Wheel Drive Wagon Company of that city. At this sale all of the machinery equipment of the plant, which included lathes, planers, shapers, boring and milling machines, drill presses, grinders and the miscellaneous tools used in the manufacture of automobiles, were offered. Bids were asked both on individual tools and groups, and in a lump sum for all. Some of the machinery was comparatively new, having been in use from two to four years, though a large part of it was bought at second hand when the plant was established about four years ago. In a number of instances the present prices of new tools of duplicate size and make were bid, and in one case at least the new tool price was exceeded by a considerable margin. The highest bid made for the whole equipment was offered by Hill, Clarke & Co., $26,800, which, it is said, was $300 more than the combined total of separate bids. In the face of a demand that makes such sales possible the urgency of industrial needs and the strength of the market can scarcely be questioned.

The diminishing supply of natural gas in the Indiana gas fields, where the cheapness of the natural product has hitherto favored the installation of gas engines, is causing power users throughout that region to seek other forms of motive power equipment. Naturally the prevalent use of gas engines in those districts invites attention to gas producer outfits, and in consequence many manufacturers are investigating the merits of gas generative apparatus as an available and economical substitute for the failing sources of nature's product. Familiarity with the operation of gas engines, because of their prevalent use in the gas belt, favors the introduction of producer gas, and it is evident from the inquiries emanating from the manufacturing interests located in those districts that much importance is attached to the economical possibilities of power service promised from producer gas outfits. In addition to its application as a motive force, it is thought that the producer may be advantageously used to supply fuel for small forges and furnaces now fed by natural gas. Inquiries are being received by makers for information as to the practicability of installing gas producer equipment for joint power and fuel service of the character suggested. The demand for gas engines, however, is not confined to any particular section of the country or class of work, but is general and of unusual proportions; this is especially true of large units ranging from 100 hp. upward. Illustrating the trend of requirements in this direction, a prominent manufacturer exhibited a schedule of delivery dates being mailed to salesmen, which instructed that shipments on gas engines of from 100 to 200 hp. could not be promised inside of six to eight months.

Milwaukee Refrigerator Transit Company's Machinery Requirements.

Dealers are figuring on the machinery equipment for the new plant of the Milwaukee Refrigerator Transit Company, Milwaukee, Wis. C. A. Chapman, 1537 Marquette Building, Chicago, is consulting engineer, and all bids or communications relative to the following list of machinery, which includes the requirements for the machine and smith shops and wood mill, should be addressed to him:

One pipe cutting and threading machine for pipe up to 1 in., two 36-in. car wheel boring machines, two double axle lathes, one 200-ton hydraulic wheel press, one 24-in. back geared shaper, one four-spindle drill press, complete with back gear and power feed; two single spindle drill presses, capacity up to 1½-in. drills, complete with back gears and power feed; one bolt threading machine, capacity up to 1½-in. bolts; one No. 5 bulldozer, to handle 1¼ x 5 in. stock; one 2-in. bolt heading machine, one 1500-lb. single frame steam hammer, to forge 1¾ x 6 in. follower plates; one 200-lb. Bradley hammer, one punch and shear, double end, to work 1⅛ x 8 in. and 15-16 x 1 in.; one 50-ton hydraulic semi-portable 18-in. gap riveter, 1500-lb. operating pressure, to drive up to ⅞-in. rivets; one nut tapping machine, capacity up to 1½-in. nuts; one 16-in. double grinder, complete with emery wheels; one grindstone, 60 x 8 in. face, with frame; one 12-in. engine lathe, with power cross and longitudinal feed, graduated cross feeds, gear speed changing device and back gear; one heavy timber sizing machine, to surface four sides of 14 x 14 in. oak; one double planer, 24 x 6 in., designed for side spindle to be added if desired; one matcher, 12 x 1⅜ in.; one heavy swinging saw for cutting 14-in. timber, one medium swinging saw for cutting 6-in. timber, one universal car tenoning and gaining machine, one hand gaining machine, one vertical car boring machine, one horizontal borer, one hollow chisel mortiser and borer, one power feed band rip saw, one 38-in. band saw, one iron frame cut-off and rip saw, with gauges; one 16-in. jointer and buzz planer, one planer knife grinder, 24 x 30 in.; one automatic saw filing and setting machine.

An important machinery list has been issued by the Berlin Machine Works, Berlin, Wis., covering equipment for its new plant now under construction at Toronto, Canada. This equipment, which comprises machinery for the manufacture of woodworking tools, is now being figured on by the trade, and involves an outlay of between $75,000 and $100,000.

A two-story brick factory building, 40 ft. square, with saw tooth roof, will be built by E. C. Walker, Urbana, Ohio, for the manufacture of mechanical specialties. None of the material or equipment of the plant, except the special tools

required in the several processes of manufacture, has been purchased. The plant will be driven by a steam plant, the engine and boiler equipment for which has not been bought. Catalogues and information relative to wood handle machines and machines and devices for tempering small tools and making small steel forgings are desired.

The purchase of a new boiler for the municipal electric light plant, Ashtabula, Ohio, is contemplated, and it is expected that an order will be placed within a few weeks.

The Crookston Mfg. Company, Crookston, Minn., notice of whose incorporation was recently given in *The Iron Age*, is planning to enlarge its plant. More machinery, such as turning lathes, drill presses and shapers, will be required to complete the equipment when the contemplated addition is completed.

The General Electric Company has placed orders for two No. 8-F Fox trimmers, which is the largest size of these machines manufactured, and 20 of the small No. 4-A Fox trimmers, for installation at the Stearns plant, Erie, Pa. This equipment was furnished by the Fox Machine Company, Grand Rapids, Mich.

The new plant of the Michigan Copper & Brass Rolling Mills, Detroit, Mich., has been equipped with two 5-ton three-motor traveling cranes. These cranes are of the low type direct current design, and were manufactured by the Northern Engineering Works, Detroit.

In order to take care of its growing business in double acting gas engines, especially those of 200 to 300 hp., the J. Thompson & Sons Mfg. Company, Beloit, Wis., has recently added to its equipment a number of new tools and machinery, including one 15-ton Pawling & Harnischfeger electric crane, one 48-in. Fifield engine lathe, three Lodge & Shipley patent head lathes, one No. 5 Barrett cylinder boring machine and one Merrill & Mitts No. 5 keyseater. The company reports much delay in getting delivery from machine tool builders, and has itself large orders on its books for future delivery.

The F. W. Spacke Machine Company, Indianapolis, Ind., maker and designer of special machinery, has completed a two-story addition to its plant, which will furnish about 10,000 sq. ft. more of floor space. The company recently purchased the entire machinery equipment of one of the local machine shops which is retiring from business, which will be installed in the new addition, together with some new machines to be purchased. When fully furnished with all machinery contemplated in present plans the factory will have double its former capacity.

The Allis-Chalmers Company, Milwaukee, has completed the installation of several carloads of new traveling cranes at its plant at West Allis. In all the company now has a total of 140 cranes in operation at that one plant, most of which, including the ones just installed, were manufactured by Pawling & Harnischfeger, Milwaukee.

The work of rebuilding and rehabilitating the street railroads of Chicago has been put in charge of a Board of Supervising Engineers of Chicago Traction, of which Bion J. Arnold is chairman. George Weston, also a member of this board, has been appointed assistant chief engineer and will have general active management of the work, reporting to Mr. Arnold. At a meeting of the board, held May 15, the Chicago City Railway Company was authorized, in view of the advancing prices of cement, to accept a proposal from the Lehigh Portland Cement Company for 20,000 bbl. of cement. The company was also authorized to secure proposals on machinery for handling material in the yards. The question of placing a contract for the welding of rails is under consideration, but since it has not been determined whether the work shall be done electrically or otherwise no decision as to the placing of a contract was reached.

Pawling & Harnischfeger, Milwaukee, Wis., announce the location of their Chicago office at 1241 Monadnock Block, which is under the management of W. E. Kreamer, who has been transferred from the Denver office, having been succeeded at the latter place by H. N. Steinbarger. G. P. Nichols & Brother, the former representatives of Pawling & Harnischfeger at Chicago, will continue their own business in the Old Colony Building.

The Monarch Motor Car Company, Chicago, Ill., whose foundry at Franklin Park was recently destroyed by fire, intends to rebuild upon a much larger scale, but has not yet decided upon a site for its new plant. The company informs us that it will need at least 200 hp. of engines and boilers. The equipment of the new plant will consist in part of 24 lathes, punch, presses, six drill presses, universal and plain milling machines, shapers, planers, saws and other equipment which is usually installed in a modern motor car plant.

It is stated that the gold movement into the United States in the fiscal year which will end June 30 will exceed that of any previous year. The figures for the 10 months ended with April show that the importations of gold amounted $109,616,707 and the exportations to $23,003,407, making the excess of imports over exports in that period $86,613,300.

New England Machinery Market.

WORCESTER, MASS., May 21, 1907.

The condition of the machine tool market is such that a satisfactory analysis of the situation is difficult. Dealers disagree decidedly in their reports of new business during the past week, and in their ideas of the immediate future. It is agreed, however, that the demand for machine tools for early delivery is just as strong as it was six months ago. A very large volume of orders would be booked if machinery could be had at an early date, but of course this is an impossible "if," as is shown by the delivery sheets sent out by the manufacturers to their agents, which indicate little improvement. But the demand for tools for delivery six months ahead or farther has decreased somewhat. The ratio of decrease increases with distance of delivery. The dealers are feeling this, while the manufacturers' order books are affected little if any, because of the foreign market, to the calls of which some of them are now better able to respond. The happy coincidence of unusual business prosperity abroad as well as at home is of great benefit to the shops, but only such dealers as control entire lines feel this advantage. The others are booking orders for early delivery when they can get the tools, and for later shipment in lessened volume. And as a rule they are getting no greater share of the outputs of the works which they represent, because where there is a falling off in domestic orders for a given period of delivery, foreign business steps in to fill the gap. The machine tool builders rightly feel that if they can do something more to push their machinery abroad it is a wise plan to do so. Many of them have consistently adhered to their original plan of allotting a certain percentage of output to foreign markets, but others have yielded to the importunities of dealers and customers and have "stolen" machines which were originally destined to leave the country.

The caution shown by customers in ordering for late delivery is quite natural, of course, after so protracted a period of unusual business, but when questioned none of them can give a reason for their action based upon tangible evidence that they will not need additional machinery later on. In certain metal lines there are reasons to believe that the autumn will see an even greater demand than that of the present, so the manufacturers state. They believe it, and are making their preparations accordingly. One dealer ventured the opinion to-day that the present falling off in orders for late delivery is merely one of the temporary lulls which have been felt off and on through the past 18 months, though not to the same extent. The fact remains that the machine shops themselves, where the tools are built, are just as busy as ever, just as anxious to secure more skilled help, just as energetic in their attempts to increase output, and just as confident that present conditions will not change for a long time to come, so far as they are concerned. Not all of them are feeling relief from their domestic trade, even in future business.

The trade is paying more active attention to certain classes of customers than has been the case during the past year. The large buyers have always been sought, to be sure, but their business has not been prized as it would be in an ordinary market. To-day the dealers and their salesmen are looking more sharply to this trade. The General Electric's list for the new buildings at Lynn, mentioned last week, is eagerly awaited. Much attention is paid to the new shops of the Boston & Albany, at Springfield, Mass., the details of which have already been printed. The New York Central does its buying of machinery from New York, where the list must be looked for, but New England men are watching closely, just the same. Tentative inquiries by the New York, New Haven & Hartford indicate that the new locomotive repair shops at the western end of the system, probably at New Haven, will be erected in no very distant future, though it is stated that the work will not be done this season. These shops will be very large ones, it is understood, fully as great as those recently completed at Readville, Mass. They will be to that portion of the system west of New London and Willimantic what the Readville shops are to the lines east of those points. The Boston & Maine repair shops have been further crippled by the destruction of the shop at Woodsville, N. H., May 15, together with a number of locomotives. Probably some new machinery will be required at other shops of the system to make good this loss, for facilities are too meager to permit of any loss at this time, for the shops have not kept pace with the increase in rolling stock. The Central Vermont Railroad's plans for new shops at New London are also coming in for quiet investigation by those salesmen who follow railroad business.

The Boston & Maine Railroad has been empowered by the Massachusetts Legislature to buy the Conway Electric Railway, which probably means the development of large

water power privileges that will come under the control of the purchaser. No details are available as to how much power will be obtained, but according to published interviews with President Tuttle of the Boston & Maine, it is possible that the electrification of the Hoosac tunnel will follow. To haul the heavy traffic of the Fitchburg Division of the system would mean the establishment of very large power stations, equipped not only for developing water power but with steam auxiliary plants for use at times of low water.

Coal prices in New England are higher than usual, because of an advance in water rates, resulting, it is said, from a very unusual loss of barges during the winter.

Hill, Clarke & Co., Boston and Chicago, have made a contract to handle the entire output of the works of the Wood Turret Machine Company, Terra Haute, Ind. The business is a new one. An entirely new line and type of turret machines will be manufactured, the principle of the turret being unique, in that it is tilted, from which fact is obtained the name, "the tilted turret" machine. The line will be confined to turret and screw machines of a few sizes only, ranging from 1 in. to 2½ in. capacity. D. W. Wood, a Rose Polytechnic alumnus, formerly superintendent of the Addressograph Company, Chicago, is president and manager of the business. The company has recently completed a new shop building, 50 x 150 ft., one story.

The Lombard Machine Company, Worcester, manufacturer of wool picking and carding machinery, is to occupy a new machine shop to be erected at Stafford and Heard streets. The new building will be 70 x 110 ft., two stories. Building will begin immediately, and it is expected that the shop will be ready for occupancy about August 1. The company states that it will probably be in the market for some new machine tools a little later, but no list of requirements has been prepared. The company came under new control about two years ago. Channing Smith, Leicester, Mass., is the president, and H. F. Gould, Worcester, treasurer. The Economic Machinery Company, a new concern, has taken a portion of the building now occupied by the Lombard Company.

The Bryant Electric Company, Bridgeport, Conn., manufacturer of electrical goods, is to erect an addition to its works, 48 x 60 ft.

The A. Carpenter & Sons Foundry Company, Providence, R. I., has awarded the contract for an addition to its iron foundry, of brick, mill construction, 55 x 120 ft.

Cincinnati Industrial Notes.

CINCINNATI, OHIO, May 21, 1907.

The Mueller Machine Tool Company, now located on Pearl street, has purchased 100 ft. front on the west side of Colerain avenue, between Queen City avenue and Draper street, and will build thereon a complete plant. This lot is about 400 ft. in depth, running practically through to Spring Grove avenue. Plans are now being made by a local architect for a building two stories high, of brick and steel, that will cover nearly the entire tract.

The John J. Bruce Foundry Company, now on Kenyon avenue, has purchased 250 ft. front, adjoining the new site of the Mueller plant, where it expects to expend in the neighborhood of $75,000 in a building, to be of concrete, two stories high and modern in every respect. Work will be commenced on both buildings at once.

The Samuel C. Tatum Foundry Company, now located at John and Water streets, has increased its capital by $100,000 6 per cent. preferred stock. The former capitalization was for $125,000 and was all common stock. It is understood that the new capital will be utilized in the erection of a new plant at Colerain avenue and Monmouth streets, consisting of a four-story building and a foundry building 108 x 308 ft.

The Dayton Iron Store Company, Dayton, Ohio, has been incorporated at Columbus, with a capital stock of $100,000, by C. F. Bryant, Joseph D. Chamberlain, I. E. Jones, C. W. Bieser and W. B. Moore. It will job heavy iron bars and steel ingots.

The Westerville Foundry & Machine Company, Westerville, Ohio, has been incorporated, with a capital stock of $25,000, by W. B. Cockell, V. A. Taylor, Charles S. Klenty and John Morrisey, to do a general machine shop business.

The Vacuum Air Compressor Company, Wauseon, Ohio, has been incorporated, with a capital stock of $500,000, by E. L. Barber, W. F. Moughter, O. W. Baker, F. G. Jaquet and C. C. Brigham, to manufacture a new air compressor.

The transfer was recorded this week of the conveyance of 22 acres of land at the northeast corner of Madison and Columbia roads, Oakley, to the Peck-Williamson Heating & Ventilating Company. Half of this tract will be used by the purchasers, and the remainder will be bought by the Mamolith Carbon Paint Company, this city. Plans for the new buildings of the Peck-Williamson Company's plant have not been as yet completed, but it is said that at least $200,000 will be spent for this purpose.

The Patric Furnace Company, Springfield, Ohio, has been compelled to enlarge its plant. It will increase the foundry capacity by the erection of a concrete structure to cost $2500.

The Barriett Electric Mfg. Company, Cincinnati, Ohio, is adding considerable equipment to its plant on East Sixth street for the production of alternating current motors. This additional equipment was rendered necessary, as the company has developed a line of alternating current induction motors which will be ready for the market in the near future.

The location of the new plant of the Seneca Chain Company, which will move to Mansfield, Ohio, has been definitely settled by the selection of a piece of property along the Erie Railroad tracks, just west of the Mansfield Engineering Works, 460 x 600 ft., comprising 6½ acres. The main shop is to be 62 x 460 ft. Additional to this will be six forge shops, 40 x 300 ft., the contract for the construction of which has been awarded, and work will be pushed forward as rapidly as possible.

The Columbus Forge & Iron Company, Columbus, Ohio, making a specialty of heavy and light forgings, is running its entire plant to its full capacity, and will at an early date arrange for the erection of additional buildings on 2 acres of ground adjoining the present plant. In addition to forgings of all kinds, the company manufactures the well-known brand of anvils under the name of Trenton, for which Herman Boker & Co., New York, are selling agents.

The Lunken Steel Window Company, Cincinnati, Ohio, has been incorporated, with a capital stock of $100,000, by Louis H. Nolte, Ben B. Dale and S. H. Moyer. The company will manufacture a patent metal window frame.

The Cincinnati Horse Shoe & Iron Company, Cincinnati, Ohio, has been incorporated, with a capital stock of $200,000, by Morgan Wamsby, C. E. Hooven, Frank C. Graham, L. B. Daniels and William Huffman. This is a reincorporation of the Graham-Phillip Horse Shoe & Iron Company, which has been operating an extensive plant at Cleves, Ohio, a suburb of Cincinnati, the only change being in the retirement of Charles Phillip, one of the original stockholders. The new organization means the availibility of additional capital, which will be used for extending the manufacturing facilities at once, as since the start, less than a year ago, the works have been pushed to their utmost to take care of the demand for the product.

Philadelphia Machinery Market.

PHILADELPHIA, PA., May 21, 1907.

Several of the larger propositions which have had the attention of the trade for some months were at least partially closed up during the past week. A large share of the requirements of the Standard Cast Iron Pipe & Foundry Company, Bristol, Pa., is understood to have been definitely placed with one of the local machinery houses, while the remainder is to be distributed among a number of other concerns. One or two other fair lots of tools were sold, some for local parties, while quite a number of orders were booked for Southern delivery. The usual day to day business was probably not as large last week as during the previous one, but total sales in several cases were helped materially by the closing of good sized lots.

The volume of business coming in is said to be somewhat below the productive capacity, although in some cases orders are reported to have exceeded it, but this is not the case generally.

Inquiries have diminished slightly in some lines, while in others they keep fully up to the average, but from the present outlook and tone of the market it appears as if there would be enough business to go round and keep everybody fairly well occupied for quite a long time.

There is no let up in the activity of manufacturing plants. Every one is being operated at full capacity, and while deliveries have improved somewhat in a number of cases, there are many instances where no improvement in shipping dates, particularly on tools of the heavier types, can possibly be had.

There has been no particular change in the foreign demand. Special tool builders continue to book some fair orders for export, but practically nothing is being done in the standard lines of tools. Power transmission and machinery specialties continue in good demand, and a very satisfactory trade is being done in those lines.

Second-hand machine tools, boilers, engines, &c., have sold fairly well during the past few weeks, and the trade is generally well satisfied with conditions in those lines.

The foundry trades appear to be a little easier, as far as the pressure of orders is concerned. Some little improvement is reported in several lines, while in others prompt deliveries are still hard to get.

The exhibit of the Foundry Supply Association, held in

connection with the annual convention of the American Foundrymen's Association during the present week in the Second Regiment Armory, is the largest display of foundry equipment and machinery that has ever been held, and has been very largely attended, not only by those interested in the foundry trade, but also by many in other branches of the trade.

The Co-operative Ice Company has under consideration the erection of an artificial ice making plant at Fifth and Wingohocking streets. The proposed building is 38 x 146 ft., three stories. The new plant is to be equipped with the latest improved machinery.

The Department of Public Works, Bureau of Water, city of Philadelphia, is asking for proposals to supply and lay a large quantity of steel or cast iron water pipe, &c., for use in connection with the high pressure fire service under Specification No. 63. Specifications may be seen at the office of the bureau, 790A, City Hall, and bids will be received until June 3.

Barwood & Snider, on the Bourse Machinery floor, have completed arrangements by which they are made the exclusive selling agents in this country for a new thread milling attachment for engine lathes, which is being manufactured by the Pinkerton Mfg. Company of this city. They have also been appointed selling agents for a new quick sharpening edge tool grinder, manufactured by the Mummert, Wolf & Dixon Company, Hanover, Pa.

The Royersford Foundry & Machine Company, Royersford, Pa., notes no change in the general business situation. All departments of the plant are fully occupied. Inquiries for punching and shearing machinery are being received in good number and a fair proportion of this business is being booked. Several additions have recently been made in the way of equipment to various parts of the plant, and the power transmission department is now able for this reason to make better deliveries than was the case some time ago. Recent deliveries of punching and shearing machinery by the company include one large machine to the Hoferer Company, Charleston, W. Va., and several to Kasper & Koetzle Company, Brooklyn, N. Y.

The Tindel-Morris Company, Eddystone, Pa., is very busy, incoming business fully averaging the outgo. The demand for Tindel-Albrecht crank shaft lathes is increasing, and a large 32-in. machine is about ready for delivery to the Union Pacific Railroad Company. Within a few weeks this concern expects to be able to make delivery on its new Tindel-Albrecht special crank shaft grinding machines, one of the first of which, a large machine, is to be shipped to the Bethlehem Steel Company.

The Birdsboro Steel Foundry & Machine Company, Birdsboro, Pa., is adding a new power plant to its equipment. This includes a 500-hp. engine with direct connected Westinghouse generator, also two Edge Moor boilers and a 125-ft. radial brick stack. This concern finds business in quite a satisfactory condition, and has taken orders recently for three large cotton compressors and a lot of miscellaneous machinery, iron and steel castings, &c.

The High Duty Saw & Tool Company, Eddystone, Pa., notes a material increase in business, and to meet the larger demand a 130 ft. extension is being made to its main machine shop, which will be equipped with a Pawling & Harnischfeger bridge crane. This concern has recently shipped a 52-in. blade Monarch cold saw cutting off machine to the Standard Forgings Company, Indiana Harbor, Ind., while orders are on the books for a No. 2 Paragon machine for the Columbus Forge & Iron Company; a No. 1 for the Erie Forge Company; a No. 3 for export to Germany, while No. 2 Paragon machines have also been ordered by the Northern Electric Mfg. Company, the Atlas Drop Forge Company, and the Chicago & Eastern Illinois Railroad Company.

The R. S. Newbold & Son Company, Norristown, Pa., is pushing to completion the various improvements to its plant which have been previously noted in these columns. A large number of minor orders, which in the aggregate amount to a considerable volume, have lately been received, as has also one order for a large rotary trimming machine, having a capacity of 1-in. thick plates for any width between 30 and 84 in. During the week this concern expects to ship a number of testing tables for one of the large plate mills and a steel shear weighing about 80,000 lb., having a capacity of 6-in. steel billets. The works continue busy in all departments.

The Newton Machine Tool Works, this city, continues to receive a good number of inquiries, and resultant orders have been quite satisfactory and have exceeded the average monthly shipping capacity. While individual orders have not been large, the aggregate business has been quite satisfactory. Among orders received was one for a large slab milling machine for one of the railroad shops. This machine will embody a number of new features, and will weigh when completed in the neighborhood of 75,000 lb. Orders have also been received for slab milling machines, key seat milling machines, slotters and a large number of cold saw cutting off machines for bar stock, structural shape and steel foundry work. Shipments last month were the heaviest for any month this year, and covered a wide range of tools, including six special extra heavy radial drills for a large railroad shop, as well as slab and vertical milling machines for similar work. A large cold saw was shipped to the Pacific Coast, while a 72-in. portable rotary planing machine and several other tools were shipped for export to France.

Government Purchases.

WASHINGTON, D. C., May 21, 1907.

The Isthmian Canal Commission will soon ask bids for one 36-in., one 24-in. and one 14-in. screw cutting engine lathes, universal milling machine, 36-in. upright drill press, 42 x 42 in. by 12 ft. planer, 22-ft. slotter and 20-in. shaper for the La Boca shops.

The circular issued by the Bureau of Supplies and Accounts, Navy Department, Washington, requesting bids on a large quantity of material which are to be opened May 28, June 4 and June 11, covers one bench cabinet makers' lathe, one bench tilting table double arbor saw, two blowers and engines, two boilers, two auxiliary condensers, one electric traveling crane, two cutters, automatic gear; three drills, bench; one drill, friction driven sensitive; one drill, radial; one drill, single spindle; seven forges, &c.; two furnaces, heating; one furnace, rotary melting; eight furnaces, &c., miscellaneous; one grinder, cutter and reamer; one grinder, cutter and tool; four grinders, emery wheel; two grinders, universal; 1 grinder, water tool; four lathes, bench; 19 lathes, engine; two lathes, speed; two lathes, toolroom; four lathes, turret; one lathe, wood, pattern makers'; two machines, automatic screw; one machine, band sawing; two machines, grinding; eight machines, milling; one machine, polishing and finishing; one machine, pipe cutting, threading and nipple; one machine, screw, plain; two machines, vertical chucking; one machine, wire feed screw; one mill, boring and turning; one mill, boring, vertical; one mixer, concrete, two planers and jointers; four presses, drill, one pump, plunger; two shapers; one shaper, high duty; one shaper, pillar; one shear, plate, angle and bar; two winches, steam.

The Isthmian Canal Commission will receive bids until May 28, Circular No. 366, for centering and drilling machines, &c.

Bids will be received until June 10, at the office of the Supervising Architect, Treasury Department, Washington, for seven high pressure steam boilers and accessories for the United States Post Office and Subtreasury Building at Boston, Mass.

The following bids for supplies for the navy yards were opened May 14:

Bidder 13, The American Hoist & Derrick Company, St. Paul, Minn.; 14, Alliance Machine Company, Alliance, Ohio; 22, Bethlehem Steel Company, South Bethlehem, Pa.; 27, F. S. Banks & Co., New York; 37, Babcock & Wilcox Company, New York; 62, William Wirt Clarke & Son, Baltimore, Md.; 65, Central Metal & Supply Company, Baltimore, Md.; 68, The Craig-Ridgeway & Sons Company, Coatesville, Pa.; 74, Chicago Pneumatic Tool Company, Chicago, Ill.; 76, Chandler & Farquhar Company, Boston, Mass.; 79, Columbus Pneumatic Tool Company, Columbus, Ohio; 82, Cleveland Pneumatic Tool Company, Cleveland, Ohio; 104, Drew Machinery Agency, Manchester, N. H.; 133, Exeter Machine Works, New York; 140, George W. Field, Philadelphia, Pa.; 141, Fox Bros. Company, New York; 144, Fox Machine Company, Grand Rapids, Mich.; 155, G. & W. Mfg. Company, New York; 164, A. D. Granger Company, New York; 165, R. W. Geldart, New York; 184, Handlan-Buck Mfg. Company, St. Louis, Mo.; 210, Hendy Machine Company, Torrington, Conn.; 212, Independent Pneumatic Tool Company, Chicago, Ill.; 213, Ingersoll-Rand Company, New York; 228, Knox & Bro., New York; 245, Lidgerwood Mfg. Company, New York; 262, Motley, Green & Co., New York; 265, Manhattan Supply Company, New York; 266, Montgomery & Co., New York; 277, Morgan Engineering Company, Alliance, Ohio; 302, Niles-Bement-Pond Company, New York; 303, Manning, Maxwell & Moore, New York; 306, New Jersey Foundry & Machine Company, New York; 315, O. K. Oleson, New Orleans, La.; 319, Oliver Machinery Company, New York; 336, Prentiss Tool & Supply Company, New York; 339, Pittsburgh Industrial Iron Works, Pittsburgh, Pa.; 342, S. M. Price Machinery Company, Norfolk, Va.; 347, Quincy, Manchester, Sargent Company, New York; 349, H. A. Rogers Company, New York; 355, J. B. Roache, Brooklyn, N. Y.; 391, Sherman-Brown-Clements Company, New York; 414, J. Jacob Shannon & Co., Philadelphia, Pa.; 419, Wm. R. Thompson, Brooklyn, N. Y.; 433, Vermilye & Power, New York; 436, Vandycke-Churchill Company, New York; 465, Williamson Bros. Company, Philadelphia, Pa.; 469, Wm. H. Wood, Media, Pa.; 478, Whiting Foundry Equipment Company, Harvey, Ill.; 491, Fairbanks Company, Philadelphia, Pa.; 492, Crescent Machine Company, Fredonia, Ohio; 497, Frevert Machinery Company, New York.

Class 411. One portable hoisting engine—Bidder 13, $1260 and $1164; 133, $1015; 155, $1246; 164, $1082 and $920; 245, $1240; 262, $1142.20; 306, $1063.81; 339, $1005.58; 433, $995; 465, $925.

Class 421. One engine lathe—Bidder 210, $1065; 303, $1066.

Class 422. One vertical drilling machine—Bidder 302, $1850; 303, $3300.

Class 431. One air hydraulic balanced jib foundry crane—Bidder 68, $1300; 184, $828; 347, $872.50; 478, $830.

Class 441. One improved hydraulic accumulator—Bidder 14, $2750; 22, $3760; 104, $2355; 165, $2294.75; 262, $2310; 277, $2125; 302, $2450 and $3225; 349, $2244; 469, $1900.

Class 442. One hydraulic riveter—Bidder 14, $3625; 22, $4798; 277, $5955; 302, $3675; 303, $3750; 469, $4700.

Class 443. One sectional flanging machine—Bidder 14, $6510; 22, $7384; 277, $9495; 302, $6100; 303, $5300; 469, $4195.

Class 444. One milling and drilling machine—Bidder 76, $200.

Class 445. Three high speed drills—Bidder 303, $435; 336, $1553.

Class 446. One test boiler, water tube type—Bidder 37, $2600.

Class 447. One pattern makers' lathe—Bidder 144, $730; 184, $750; 319, $875.

Class 448. One band saw—Bidder 104, $174 and $189.75; 144, $197.50; 315, $210; 319, $264 and $213; 492, $129.

Class 449. One buzz planer—Bidder 104, $200, $234 and $302; 140, $239.75; 184, $380; 315, $247; 319, $496 and $286.

Class 451. One cold metal sawing machine—Bidder 302, $1677; 336, $696, $753, $757 and $788; 436, $975.

Class 566. Two pneumatic drills—Bidder 74, $135; 79, $160; 82, $160; 141, $198; 212, $119.50; 213, $180; 414, $184.

Class 567. Two hammers, pneumatic—Bidder 74, $100; 79, $80; 82, $100; 141, $130; 212, $79.50; 213, $119; 228, $135; 414, $116.

Class 568. Sixteen hydraulic and screw jacks—Bidder 62, $342.80; 141, $321.12; 228, $332; 266, $336; 303, $322; 342, $307.40; 355, $321.21; 391, $338.44; 414, $334.40; 491, $335.60; 497, $185.30.

Class 570. Two valve reseating outfits—Bidder 27, $650; 65, $650; 104, $650; 141, $650; 165, $650; 228, $650; 265, $650; 266, $650; 303, $650; 342, $650; 355, $650; 391, 650; 419, $650; 491, $650; 497, $650.

The Browning Engineering Company, Cleveland, Ohio, has been awarded contract for the traveling crane for the Charleston Navy Yard at $51,000.

The following awards have been made for supplies for the navy yards, bids for which were opened April 9:

The Waterbury-Farrel Foundry & Machine Company, Waterbury, Conn., class 51, one double action open back press, $1600.

Manning, Maxwell & Moore, New York, class 62, one No. 4 single punching and shearing machine, $1675.

Motley, Green & Co., New York, class 64, one water tool grinder, $290.

Under bids opened March 26 for supplies for the Isthmian Canal Commission, Circular No. 355, the Niles-Bement-Pond Company, New York, has been awarded class 9, one screw cutting engine lathe, $1000.

Catalogues Wanted.—The Cambria Steel Company, Johnstown, Pa., will be pleased to receive catalogues from manufacturers of machinery and supplies for general steel works equipment. All catalogues should be addressed to John W. Gocher, chief engineer.

Ignaz Lamm, Munchen, Germany, would be pleased to correspond with manufacturers in this country with a view of taking the agency for American products in iron and steel, machinery, &c. Mr. Lamm desires catalogues and samples.

Work has been started on rebuilding the plant of the Reinforced Brazing & Machine Company, Pittsburgh, which was destroyed by fire some time ago. The new building will be 100 x 100 ft. and will be equipped with a hand power traveling crane. A contract has been placed with the Colburn Machine Tool Company, Franklin, Pa., for a 72-in. boring mill; also with the Cincinnati Milling Machine Company, Cincinnati, Ohio, for a No. 3 Cincinnati universal milling machine, equipped with double back gears, and for a No. 1 universal tool cutter and grinder.

A very serious explosion occurred at No. 1 Eliza Furnace of the Jones & Laughlin Steel Company, Pittsburgh, on Tuesday evening, by which five men were instantly killed and a number of others were seriously injured. Among those killed was E. B. Willard, chief engineer of the plant. The cause assigned for the accidept is the giving away of the dust catcher at the time the furnace was being tapped.

CONTENTS.

	PAGE.
Ore Vessels Fighting Ice. Illustrated	1549
Electric Haulage on a Shipway	1550
Function of the Soft Metal Cap for Projectiles	1550
Sir Hugh Bell's Presidential Address	1550
The Cronemeyer Gas Valve. Illustrated	1551
Electrical Equipment of the St. Louis	1551
The Art of Galvanizing.—I	1552
To Test Explosives Used in Coal Mining	1555
British Electrically Equipped Shipbuilding Berths	1556
The Dallett Motor Driven Boiler Shell Drill. Illustrated	1556
Pennsylvania Business Legislation	1557
A Continuous Heating Furnace. Illustrated	1558
The Amalgamated Scales	1559
An English Coaling Station	1559
The Gayley Process and the Bessemer Steel Rail	1559
The Temple-Ingersoll Electric-Air Drill. Illustrated	1560
Cast Thread Fittings	1561
The Long Island Terminus of the Pennsylvania Tunnels	1561
Shipbuilding in Germany	1561
Two New Reed Engine Lathes. Illustrated	1562
The Foundry as a Business Venture	1564
Scientific Discovery	1566
The Proper Installation and Use of Compressed Air	1567
New Freight Rates on Iron and Steel	1568
Freight Rates on Iron Ore	1568
An Anglo-Japanese Steel Company	1568
The Use of a Heated Foundry Mixer	1569
The Providence Machinists' Strike	1569
Wing's Turbine Fan. Illustrated	1570
Notable Subaqueous Rock Removal	1570
The Improved Whitney Mine Car Wheel and Truck. Illus.	1571
Acheson Graphite Lubricant	1572
The Machine Tool Builders' Convention	1573
Editorial:	
The Iron Age Directory	1576
The Passing of Machine Shop Restrictions	1576
Manufacturers as Salesmen	1576
Power Plant Diaries	1577
The German Steel Syndicate	1578
Engine Balancing Experiments	1578
A New Agreement with British Machinists	1579
The National Association of Manufacturers	1580
Canadian Industrial Notes	1582
Dominion Iron and Steel Operations	1582
Obituary	1583
Ashtabula Ore Dock Improvements	1583
The American Foundrymen's Association	1584
A Nova Scotia Steel Company Buys a Brazilian Ore Deposit	1586
Blast Furnace Gas Explosion	1587
Personal	1587
News of the Works:	
Iron and Steel	1588
General Machinery	1588
Power Plant Equipment	1588
Foundries	1588
Bridges and Buildings	1588
Motors and Small Engines	1589
Hardware	1589
Miscellaneous	1589
The Iron and Metal Trades:	
A Comparison of Prices	1590
Chicago	1590
Philadelphia	1592
Pittsburgh	1593
Cincinnati	1595
Birmingham	1595
Cleveland	1596
New York	1597
Metal Market	1597
Iron and Industrial Stocks	1598
Gould Pumps Shown at the Cotton Convention	1598
Labor Notes	1599
New Publication	1599
Trade Publications	1600
The Machinery Trade:	
New York Machinery Market	1601
Cleveland Machinery Market	1601
Chicago Machinery Market	1602
New England Machinery Market	1603
Cincinnati Industrial Notes	1604
Philadelphia Machinery Market	1604
Government Purchases	1605
Hardware:	
Condition of Trade	1607
Notes on Prices	1608
The Richmond Convention	1609
Death of Andrew B. Hendryx. Portrait	1610
Walter M. Aikman's Sixtieth Anniversary	1610
Supplying Merchants with Outdoor Advertising Matter	1610
The Iron Age Directory for 1907. Illustrated	1611
The National-New England Conventions at Boston	1611
Georgia Hardware Association	1612
Death of D. P. Bilsh. Portrait	1612
Hardware Window Display. Illustrated	1613
Window Monument for Memorial Day	1613
An Elaborate Fishing Tackle Exhibit. Illustrated	1614
Noteworthy Spring Advertisements. Illustrated	1615
The Standard Arms Company	1615
Chandler & Farquhar Company's Annual Banquet	1615
Trade and Customs in Java, Dutch East Indies	1616
Requests for Catalogues, &c	1617
Export Trade Topics	1618
Price-Lists, Circulars, &c	1619
The Babcock Mfg. Company	1620
Repair Outfit for Bibs. Illustrated	1620
Interchangeable Steel Rules. Illustrated	1620
The Nondestructible Pea Trellis. Illustrated	1620
Ideal Band Saw Sharpener. Illustrated	1621
The New Century Screw Driver. Illustrated	1621
Witch Safety Razor. Illustrated	1621
Bent Rung Ladders. Illustrated	1622
Lancaster Combination Corner Brace. Illustrated	1622
Auto Refrigerator Basket. Illustrated	1623
Current Hardware Prices	1624

HARDWARE

WHILE it is essential to the successful conduct of business that goods be sold at a profit, whether by the manufacturer or jobber, it should always be borne in mind that high prices militate against volume of business. If the jobber, for example, holds some specialty, or indeed any line of goods, at an unreasonably high price, it will tend to limit the quantity sold. A case in point was recently brought to our attention by a manufacturer who is putting on the market a tool of recognized merit, which was sold by the jobbers in a certain city at an advance of over 75 per cent. on the price they paid for it. The manufacturer naturally complained of the injustice done to him, as those who posed as distributers of his product thus actually discouraged its sale. The jobbers in justice to the manufacturers should sell goods of this class at a reasonable profit and at as low a price as possible.

In a recent issue we referred to the condition of the market for metal roofing and mentioned two significant facts: First, that the prices at which this roofing is held by many Eastern jobbers are materially higher than those made by the Western jobbers, and secondly, that the quantity sold in the West is much greater than in the East. It might be, according to the operation of familiar laws of trade, that the small demand is the reason for the comparatively high price or that the high price explains the small demand. A prominent manufacturer of this line of goods, connecting the two facts, finds the reason for the smaller sale in the East in the exorbitant figures at which it is not infrequently sold. He expresses the opinion that if Eastern jobbers were to reduce their prices to a reasonable margin of profit a materially greater demand for this and other iron and steel products would be created. Other influences may operate to render the West and Southwest the principal field for the commodity in question, but there can be little doubt that the cost of distribution, on account of the greater profits expected by merchants supplying the smaller trade, is something of an obstacle to its sale.

The development of the automobile industry promises to do something to broaden the Hardware field. Its influence is indeed felt to a limited extent already in many stores. The prevalent use of automobiles has created a great demand for automobile supplies, which include a wide range of goods. Many of these have not heretofore been regularly handled through any established trade channels save the automobile sales agencies. Gradually, however, Hardware dealers have been adding certain items of the line to their stocks, until it is becoming apparent that such supplies will soon be recognized as belonging essentially to the Hardware trade. As indicating the trend of this movement it is significant that a great Hardware jobbing house in Chicago is now establishing a department which will be devoted exclusively to automobile supplies. The taking up of this line by Hardware merchants will prove decidedly advantageous to tourists, who can be assured of securing supplies when out of reach of the usual cosmopolitan sources of supply. In this way their convenience will be served and a profitable field opened up for Hardware enterprise, while at the same time the interests of this industry, which has made such startling progress within a very few years and which has before it such possibilities, will be advanced.

Condition of Trade.

The passing of a week, with its assortment of seasonable and unseasonable weather, has brought but little change in the general business situation. The late spring has naturally interfered with the sale of many spring and summer goods, as purchasers have deferred buying until they felt the need of the goods, and the postponing of purchasing may result in diminishing somewhat the volume of the season's business in this class of articles. There appears to be a good measure of activity in the building line, although reports are not wanting of a more conservative spirit in this direction, owing to the high costs which prevail. Many sections of the country have felt the influence of the cold and rainy weather, and while the interference with the crops in the West and Northwest has been emphasized in current reports, it would appear that the disturbance with normal agricultural conditions in the South has been, perhaps, as serious. The damage done is not, however, irreparable, and it may well be that favorable conditions the next few weeks, under the beneficent resilience and resourcefulness of nature, will make up for lost time and repair in good part the injury which has been suffered. The country certainly seems to take a cheerful view of the situation, inasmuch as the uncertainty concerning crops does not appear to be regarded as a sufficient menace to trade to diminish at all seriously its volume. Indeed, throughout the country the merchants of the rural districts and of the towns and cities are attending to their business in a sensible and practical manner, finding little reason to curtail their purchases or relax their efforts. While jobbers are well supplied with goods, there are some lines in which the market still shows a shortage, and merchants who did not order in good season are suffering the proper penalty of their neglect. Manufacturers are still confronted with the difficulty of obtaining material promptly, although in most lines there is less complaint on this score than a few months ago. Much is heard, too, of car shortage, and delays in freights, with the delay on the part of manufacturers in executing orders, are the cause of not a little inconvenience to merchants. Collections generally are reported as giving little cause for complaint. Existing conditions, on the whole, are very satisfactory, and the outlook promising, with much depending on the volume and value of the coming harvest.

Chicago.

Notwithstanding the disquieting effects of some seemingly unfavorable conditions, trade in Hardware lines shows remarkable strength and vigor. It was thought that if the rumors of crop damage proved well founded and the situation was anything like as serious as reported a noticeable decrease in consumptive demand would be quickly reflected in a decrease of jobbers' sales. Such results have not followed to any appreciable extent. It may be noted in this connection that, though a large acreage of winter wheat was destroyed by insects in Oklahoma and the Panhandle of Texas, the damage was done in time for reseeding with other crops, such as corn and cotton, which will, in a measure at least, counterbalance the loss. In the North and Northwest a similar adjustment may result from the reseeding of frozen out winter wheat fields with spring wheat. Though trade for the month of May promises to largely exceed in volume that of the same month a year ago, it is not expected to equal the phenomenal totals of either of the two preceding months. In some lines factory shipments are be-

ing made with more promptness, though improvement in this respect is far from being universal. No betterment is observed in the delivery of Wire Nails, and as a result jobbers are shipping carload orders from stock, at an advance of 13 cents per keg over the price asked for mill shipments. The heavy drain thus made upon warehouse stocks has produced an extraordinary scarcity of certain sizes, which is a source of great inconvenience to both merchants and consumers. The continued demand for Nails can only reflect a remarkable activity in construction work throughout the country. Heavy Hardware goods are moving as freely as at any time this year. The requirements of wagon manufacturers, both in wood and iron stock, are large, and jobbers report the booking of unusually heavy orders. Implement makers are placing orders for Steel Bars, Bolts, Nuts and other material with more liberality than was expected in view of short crop prospects. The fact that Hibbard, Spencer, Bartlett & Co. are organizing a department devoted to the handling of automobile supplies is not only a characteristic evidence of enterprise but an indication of a trade tendency.

NOTES ON PRICES.

Wire Nails.—The mills are rendering better service to customers, with a somewhat diminished demand as compared with the month of April. Steel and cars are not quite so hard to obtain and better deliveries are in prospect in the future. Stocks of Nails are low both at mills and in jobbers' hands, and prompt shipments are urged to be able to supply customers' demands. Small orders are being received at 5 to 10 cents per keg advance by some of the smaller mills that can make something like prompt shipments. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$2.00
Carload lots, to retail merchants	2.05

New York.—The local market is sensitive to climatic changes, as affecting the volume of demand. Business has therefore been irregular, some days larger than others, but the average has been good, and if this continues the month will probably run ahead of April in the output of small lots from store. New York jobbers' quotations are: To retailers, carloads, on dock, $2.19; less than carloads, on dock, $2.33; small lots at store, $2.30.

Chicago.—An increasing demand for Nails has steadily depleted stocks until the mill warehouses are practically bare of supplies. The anxiety of customers for the delivery of belated shipments is voiced in importunate appeals, which signify the pressing needs of consumers. The situation presents difficulties for both factory and dealer, and the prospects for immediate betterment are not reassuring. Quotations are as follows: $2.15 in car lots to jobbers and $2.20 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—The volume of new business being entered by the mills continues heavy, but is not as large as in April, and with a better supply of Steel and also of cars, the mills are finally able to catch up on deliveries to some extent. Stocks held by jobbers and also by the mills continue light, but these will be strengthened as the mills continue to make better deliveries. Some of the smaller mills that can make reasonably prompt shipments continue to ask 5 to 10 cents per keg advance, and are entering small orders at these prices. The market is unchanged, but very strong. Prices are unchanged, but very firm. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$2.00
Carload lots, to retail merchants	2.05

Cut Nails.—The mills are reported as catching up with deliveries to some extent and are also accumulating some stocks. Some mills are asking 5 cents per keg advance over regular prices, and are so filled with orders that they cannot make shipments until after June 1. According to reports, some mills are offering Nails for reasonably prompt shipments at slightly lower prices than regular quotations, but such cases are exceptional. Quotations are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, $2.05; less than carloads, to jobbers, $2.10; less than carloads, to retailers, $2.20. Iron Cut Nails at points west of and including Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

New York.—Business continues in about the same volume as for some time. Jobbers' stocks, however, are still somewhat poorly assorted, owing to shipments being delayed at mill. New York jobbers' quotations are on the basis of $2.30 for small lots at store.

Chicago.—Cut Nails, which last week were somewhat quieter as to demand, show more activity. Jobbers are in some cases getting an advance of 5 cents a keg over regular prices, and some mills are quoting a similar advance. Quotations are as follows: Iron Cut Nails, car lots, to jobbers, $2.30; to retailers, $2.35; Steel, to jobbers, in car lots, $2.20; to retailers, $2.25.

Pittsburgh.—We note a fair demand for Cut Nails, but owing to a little better supply of Steel and more cars, the mills are catching up on deliveries and stocks of Cut Nails held by jobbers and also by the mills are growing larger. It is stated that in exceptional cases Cut Nails for reasonably prompt delivery are being offered at slight concessions over regular prices, while, on the other hand, some mills are asking a premium of 5 cents a keg for prompt shipment. Quotations are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, $2.05; less than carloads, to jobbers, $2.10; less than carloads, to retailers, $2.20. Iron Cut Nails at points west and including Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

Barb Wire.—Specifications are still being received in good volume at the mills, but new orders are growing less on account of the lateness of the season. The amount of Barb Wire distributed this season has been very large. The market is firm, and quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.15	$2.45
Retailers, carload lots	2.20	2.50
Retailers, less than carload lots	2.30	2.60

Chicago.—The demand has already far outlived expectations and in this market is as strenuous as ever for entered specifications. Indications, however, point to a quieter movement since new business is not accumulating as rapidly as heretofore. We quote as follows: Jobbers, Chicago, car lots, Painted, $2.30; Galvanized, $2.60; to retailers, car lots, Painted, $2.35; Galvanized, $2.65; retailers, less than car lots, Painted, $2.45; Galvanized, $2.75; Staples, Bright, in car lots, $2.25; Galvanized, $2.55; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—Specifications on contracts are still coming in quite freely, but new business has shown a marked falling off, owing to lateness of the season. Shipments by the mills continue heavy and they are catching up to some extent on back deliveries. The market is firm but unchanged. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.15	$2.45
Retailers, carload lots	2.20	2.50
Retailers, less than carload lots	2.30	2.60

Smooth Fence Wire.—The demand continues active, Fence manufacturers being very busy. Mills are expecting to catch up with deliveries owing to a better supply of steel and cars, and to the anticipated falling off in demand as the season advances. The market is firm, and quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.85
Retailers, carloads	1.90

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago.—However much conditions may have seemed to favor it, the looked for slackening of demand for Smooth Wire has not yet appeared. Fence makers are extremely busy and are urgent in their demand for material. Quotations are as follows: In car lots, to jobbers, $2, f.o.b. Chicago, and to retailers, $2.05.

Pittsburgh.—We note a continued active demand for Fence Wire, while specifications against contracts are very heavy and the mills are catching up very slowly on deliveries. It is probable that owing to lateness of the season the volume of business in Smooth Wire will soon show a decided falling off and this with the better supply of steel and also of cars will permit the mills to catch up on delayed deliveries. Prices are firm but unchanged. We quote f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.85
Retailers, carloads	1.90

The foregoing prices are for base numbers, 6 to 9.

Carriage and Wagon Springs.—The market in Carriage and Wagon Springs is characterized by a firm tone. It is intimated by some of the manufacturers that it may be necessary to make still further advances to cover the increased cost of material when new contracts must be made. The makers of these goods, however, are generally working on conservative lines and apparently reluctant to advance prices unless under the pressure of necessity. In view of the fact that nearly all the material which enters into Springs is sold on a net 30-day basis, some at least of the manufacturers have reduced the 10-day cash discount to 1 per cent., instead of 2 per cent., as heretofore.

Strap and T-Hinges and Butts.—As expected in accordance with the announcement made in our last issue, manufacturers of Strap and T-Hinges and Butts have issued new discount sheets under date of May 20. No change was made in the base discounts on Butts, but an advance in Hinges is announced amounting to about 10 per cent. The following are the new base discounts, on which extras of from 10 to 10 and 10 per cent. are obtainable, as heretofore:

	Discount.
Light Strap Hinges	50 and 10 %
Heavy Strap Hinges	60 and 5 %
Light T Hinges	50 %
Heavy T Hinges	40 %
Extra Heavy T Hinges	50 and 10 %
Hinge Hasps	33⅓ %
Corrugated Heavy Strap Hinges	60 and 5 %
Corrugated Extra Heavy T Hinges	50 and 10 %

Jack and Safety Chain.—The market for Jack and Safety Chain is rather dull, and comeptition is said to be increasing for such orders as are to be had. In the main prices are well maintained, but it is reported that at least one of the manufacturers is showing some disposition to shade quotations.

Revolvers.—An advance of 50 cents per piece on Automatic and Hammerless Revolvers was recently made by the associated manufacturers, making the established price on the Automatic Revolvers $4 and on the Hammerless $4.50.

Rope.—A fair business is transacted by the manufacturers, but the season appears to be two or three weeks behind as far as demand is concerned. Card prices remain unchanged, yet in the lower grades of Rope there are some variations, to which the following quotations are subject: Pure Manila, 13 to 13½ cents; B quality, 12 to 12½ cents; Pure Sisal, 9¼ cents; No. 2 quality, 7¾ to 8 cents; No. 1 Jute, ¼ in. and up, 9 cents; No. 2 Jute, 8½ cents.

Window Glass.—The going out of blast of additional pots each week will have a beneficial effect upon the market, though this may be slow in showing itself in active buying. At the meeting of the Western Window Glass Jobbers' Association, held in Chicago last week, prices were reaffirmed as follows: Single strength Glass, 90 and 10, and double strength, 90 and 15 per cent. discount. Prices recommended by the Eastern Window Glass Jobbers' Association are as follows: Jobbers' quotations from jobbers' list October 1, 1903, Greater New York, 90 and 10 per cent. discount on all sizes, single and double strength. Outside of Greater New York, in the Eastern District, prices are not uniform, ranging from 90 and 5 for single and 90 and 10 per cent. discount for double, to 90 and 15 for single, and 90 and 20 per cent. discount for double, according to location of territory.

Binder Twine.—The market is dull and buying is on a limited scale. With current reports of injury to crops the market for Twine shows some wavering. The opinion is expressed that a curtailed output of Twine by manufacturers is the only means of preventing a surplus. Prices are consequently somewhat irregular, and the following may be taken as a guide to the market: Sisal and Standard, 9 to 9⅝ cents; Manila, 10¾ cents, which is sometimes shaded; Pure Manila, 13¾ to 14 cents per pound, with usual discounts for large lots, central delivery.

Linseed Oil.—There is a fairly satisfactory demand, including new business and shipments on contract, but the market is without snap. Unsettled weather probably has something to do with local conditions. New York quotations for jobbing lots are as follows, according to quantity: City Raw, 44 to 45 cents per gallon; Out of Town Raw, 42 to 43 cents per gallon, according to seller. Boiled Oil is 1 cent a gallon over Raw.

Spirits Turpentine.—Reports are to the effect that Jacksonville is sending Turpentine to Savannah, which increases supplies at the latter point and has a depressing influence on prices. The local market is without much activity and prices are lower. New York quotations are as follows, according to quantity: Oil Barrels, 63½ to 64 cents; Machine Made Barrels, 64 to 64½ cents per gallon.

THE RICHMOND CONVENTION.

The Southern Hardware Jobbers' Association, W. W. Webber, secretary, Fort Smith, Ark., has perfected its programme for the annual convention which will be held at Richmond, Va., June 11-14, the American Hardware Manufacturers' Association as usual meeting at the same time and place, the Jefferson. The jobbers' programme includes a number of papers or addresses on practical and timely topics, as follows: "Benefits of Membership in the Southern Hardware Jobbers' Association and a Member's Duty to It," by Secretary W. W. Webber: "Why a Jobber Should Sell at Net Prices Instead of Discounts," by Ben. J. Schuster, Selma, Ala.; "A Jobber Should Compute His Profits on His Selling Price Rather Than His Cost," by Lee Richardson, Vicksburg, Miss.; "The Necessity for Increasing Profits and How It Can Be Done," by W. L. Sanford, Sherman, Texas; "The Essential Elements of a Credit Man," by R. D. Warren, Memphis, Tenn.

Joint sessions with the Manufacturers' Association will be held on Wednesday and Thursday afternoon, during which the following formal addresses will be made: "Should Not the Hardware Jobbers Properly Anticipate Their Requirements," by Robert Garland, Garland Nut & Rivet Company, Pittsburgh; "Importance of the Customary Cash Discount to the Jobber," by J. C. Sproul, Anniston, Ala.; "What Constitutes a Hardware Jobber?" by G. H. Jantz, American Wringer Company, New York; "The Disposition of Manufacturers to Encourage Jobbing at Places Not Recognized as Jobbing Centers," by T. G. Ewing, Gadsden, Ala.; "The Future Outlook of the South," by Harry Wise, *The Tradesman*, Chattanooga, Tenn.

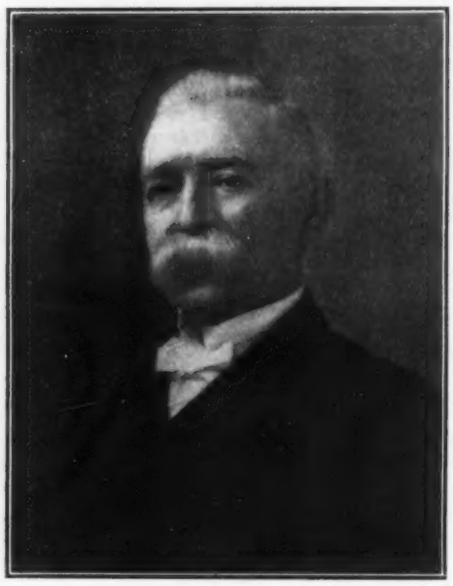
A banquet will be given on Thursday evening, the details of which have not yet been arranged.

Charles Newman, Sturgis, Mich., has sold his stock of Hardware to Michael Brothers of that city, who will consolidate it with their present stock.

DEATH OF ANDREW B. HENDRYX.

ANDREW B. HENDRYX, head of the Andrew B. Hendryx Company, New Haven, Conn., died at his home in that city May 9, in his seventy-fourth year. He was born in Southbury, Conn., April 7, 1834. His mother, Rosette Booth, had great force of character, and his father, Wilson E. Hendryx, a manufacturer and inventor, was a man of rigid religious principles. Among Mr. Hendryx's earlier ancestors were Richard Booth, who came from England in 1640 and settled in Stratford, Conn., and Michael Han, a German, who settled in Newtown, Conn., in 1752, while more recent were William Hendricks, Governor of Indiana in 1822, three times a representative in Congress, and twice a United States Senator. He was also closely related to Thomas A. Hendricks, Vice-President of the United States in 1885.

As a boy Mr. Hendryx was robust and active, and his rugged constitution made him industrious. He early manifested decided mechanical genius and possessed an investigating turn of mind. He read mechanical works and studied drawing. At the age of 11 he began to support himself, and after that he never attended school in



ANDREW B. HENDRYX.

the day time, though he studied at night school until he was 25 years old.

Mr. Hendryx learned the machinists' trade in Chicago, and in 1865 became superintendent of the Smith foundry in New York, and, it is said, personally directed the casting of the first car wheel made in America, the pattern afterwards becoming standard and substantially the same design as used to-day. Soon afterwards Mr. Hendryx went to Ansonia, Conn., entering the employ of the Ansonia Brass & Copper Company, remaining with the company until 1875, when he formed a partnership under the name of Hendryx & Bartholemew, which became A. B. Hendryx & Co. the next year, Nathan S. Johnson and the late Lockwood Hotchkiss being his partners.

The company moved to New Haven in 1879, and 10 years later the business was incorporated under its present title, with Mr. Hendryx as president. He had built up a large business manufacturing Bird Cages, Fishing Reels and other kindred devices and Picture Cord. Much of the company's success has been attributed to Mr. Hendryx's many patented inventions and improved methods of manufacture. He was also indefatigable and constant in his efforts to impress upon the trade the fact that his goods were always and always should be full weight, full length and full count. When asked to give others the benefit of his experience in achieving success, his invariable answer was "work." Mr. Hendryx was a member of the Union League Club and Quinnipiack Club of New Haven. He is survived by a widow, one son, Nathan W. Hendryx, and two daughters.

WALTER M. AIKMAN'S SIXTIETH ANNIVERSARY.

AN interesting and unique event took place on Friday last at the office of the Central Stamping Company, 24 Cliff street, New York. It was the sixtieth anniversary of the president's connection with the Metal Ware business, first with the firm of N. E. James & Co., then with James, Aikman & Co., and since 1885 with the Central Company, into which the houses of James, Aikman & Co. and E. Ketcham & Co. were at that time merged. The directors, officers, clerks and a large delegation from the factory at Newark, N. J., filed into the president's room exactly at high noon and presented him with a handsome loving cup, inscribed as follows: "May 17, 1847—May 17, 1907. Presented to Mr. Walter M. Aikman by the officers and employees of the Central Stamping Company in recognition of 60 years' honorable business service and also as a token of personal regard and affection."

George W. Ketcham, the vice-president of the company, spoke the words of greeting, referring to Mr. Aikman's noble character, his fidelity to every interest and his kindly treatment of all connected with the office or factory. James A. Webb and Geo. R. Turnbull, both directors of the Central Stamping Company, expressed their good wishes to Mr. Aikman on the completion of this long business career. Mr. Aikman was quite overcome by the unusual demonstration, but replied in most appropriate phrase, recalling some of his experiences with the men of the earlier firms.

SUPPLYING MERCHANTS WITH OUTDOOR ADVERTISING MATTER.

THE practice of manufacturers supplying attractive signs and other advertising matter for merchants to use in their stores in calling attention to the manufacturers' lines is now quite generally followed. It would seem, however, that a step in advance has been taken by the Hopkins & Allen Arms Company, Norwich, Conn., in offering to the trade outdoor signs suitable for use not only near the store, but also in the outlying country. This company has just got out a muslin waterproof sign in four colors, with an exact size cut of its new .22 Caliber Military Bolt Action Repeating Rifle, and will send prepaid to any merchant as many of these signs imprinted with his name and address as he will agree to post in his locality. This proposition should be advantageous from the fact that it enables a man to announce that he is a Fire Arms merchant as well as to advertise the fact that he carries this special line. The muslin signs referred to are described as waterproof and guaranteed to withstand rain and weather for two years. They may be posted at fair grounds, baseball parks, on regular bill boards or along the roadside leading into a town.

COL. CHARLES M. JARVIS, of the staff of Gov. R. C. Woodruff of Connecticut, and first vice-president of the American Hardware Corporation, New Britain, was tendered a complimentary dinner at the Hartford Club in Hartford a short time ago. The dinner was given by Governor Woodruff and his staff, who presented Colonel Jarvis with a handsome silver loving cup suitably inscribed, Governor Woodruff making the presentation speech. Colonel Jarvis' friends took this occasion to wish him *bon voyage* for his European trip on which he has embarked.

THE ALPENA HARDWARE COMPANY, Alpena, Mich., opened in the wholesale and retail business on the 8th inst. C. E. Moore, formerly with Morley Bros., Saginaw, is president of the company; James B. Forman, late chief clerk of Potter Bros., Alpena, treasurer and general manager, and Jas. B. Lough, Alpena, secretary.

G. W. Broderick, Gallatin, Mo., has sold his Hardware, Stove, Tinware and Implement business to Castel Brothers.

The Iron Age Directory for 1907.

THE IRON AGE DIRECTORY for 1907, the 11th annual edition, is now being distributed to subscribers in all parts of the world, every subscriber to *The Iron Age* being entitled to a copy without charge. The book this year is furnished with a stiff instead of a flexible cloth cover as formerly, which it is believed will be appreciated by the trade. The 1907 edition is by far the largest and most complete yet issued, containing 331 pages, one of which, to give an idea of the great scope and compact yet clear typographical arrangement, is reproduced herewith. The products of 1436 concerns, including houses large and small, in the lines with which *The Iron Age* has

The Iron Age Directory 179

Lifting Apparatus, Sash—
Hitchings & Co., 1170 Broadway, N. Y.
Lifting Handles, Scales—
(See Handles, Scales.)
Lifts, Acid—
Bethlehem Foundry & Machine Co., So. Bethlehem, Pa.
Lifts, Invalid—
Storm Mfg. Co., Newark, N. J.
Lifts, Sidewalk—
(See Hoists, Sidewalk.)
Lighters, Gas, Electric—
W. R. Ostrander & Co., 22 Dey St., N. Y.
Lighting Systems, Gasoline—
American Gas Machine Co., Albert Lea, Minn.
Lighting Systems, Kerosene—
Turner Brass Works, Franklin & Michigan Sts., Chicago, Ill.
Lightning Arresters—
(See Arresters, Lightning.)
Lightning Rod Fixtures—
Cleveland Galvanizing Works, Cleveland.
Lights, Side and Deck—
W. & J. Tiebout, 118 Chambers St., N. Y.
Lights, Sidewalk—
(See Iron Work, Builders'.)
Lignumvitae, in Log—
Boston & Lockport Block Co., Boston.
Limestone—
Columbus Iron & Steel Co., Columbus, O.
Limestone, Crushed—
Reed F. Blair & Co., Pittsburgh, Pa.
Line Cleats, Grips—
(See Cleats, Grips.)
Line Material, Electric Light—
(See Electric Light Line Material.)
Liners, Locomotive Guide—
L. S. Starrett Co., Athol, Mass.
Liners, Section—
Keuffel & Esser Co., 127 Fulton St., N. Y.
L. S. Starrett Co., Athol, Mass.
Lines, Chalk, Masons', &c.—
Samson Cordage Works, Boston, Mass.
Silver Lake Co., Boston, Mass.
Turner & Stanton Co., Norwich, Ct.
Lines, Clothes, Cotton, &c.—
Estes Mills, Fall River, Mass.
Samson Cordage Works, Boston, Mass.
Silver Lake Co., Boston, Mass.
Turner & Stanton Co., Norwich, Ct.
Lines, Clothes, Manila and Sisal—
Plymouth Cordage Co., North Plymouth, Mass.
Lines, Clothes, Wire—
Ludlow-Saylor Wire Co., St. Louis, Mo.
Parker Wire Goods Co., Worcester, Mass.
Williamsport Wire Rope Co., Williamsport, Pa.
Wire Goods Co., Worcester, Mass.
Wright Wire Co., Worcester, Mass.
Lines, Fishing—
Clark, Horrocks Co., Utica, N. Y.
Dame, Stoddard & Co., Boston, Mass.
Lines, Garden—
Samson Cordage Works, Boston, Mass.
Silver Lake Co., Boston, Mass.
Lines, Tent and Awning—
Silver Lake Co., Boston, Mass.
Lines, Towing—
New York Cordage Co., 83-85 Wall St., New York.
Linings, Cupola—
Hayes Run Fire Brick Co., Orvis, Pa.
Northern Engineering Works, Detroit, Mich.
S. Obermayer Co., Cincinnati, O.
J. W. Paxson Co., Philadelphia, Pa.
M. D. Valentine & Bro. Co., Woodbridge, N. J.
Whiting Foundry Equipment Co., Harvey, Ill.
Linings, Dress, Crinoline—
I. E. Palmer, Middletown, Ct.
Linings, Fine—
Hayes Run Fire Brick Co., Orvis, Pa.
Linings, Stove—
Harbison-Walker Refractories Co., Pittsburgh, Pa.
Hayes Run Fire Brick Co., Orvis, Pa.
Ostrander Fire Brick Co., Troy, N. Y.
Link Belting, Chain—
(See Belting, Chain Link.)
Links, Bed—
Wm. D. Gibson Co., Huron and Kingsbury Sts., Chicago, Ill.
E. H. Titchener & Co., Binghamton, N. Y.
Links, Car Coupling—
Cleveland City Forge & Iron Co., Cleveland, O.
Jones & Laughlin Steel Co., Pittsburgh.
Keystone Drop Forge Works, Chester, Pa.
Pittsburgh Forge & Iron Co., Pittsburgh, Pa.
Standard Chain Co., Pittsburgh, Pa.
Links, Chain—
(See Chain Links.)
Links, Fusible—
Lane Bros. Co., Poughkeepsie, N. Y.
M. Lanz & Sons, Pittsburgh, Pa.
Richards Mfg. Co., Aurora, Ill.
Links, Repair and Lap—
Beecher Draught Spring Co., New Haven.
Bridgeport Chain Co., Bridgeport, Ct.
Keystone Drop Forge Works, Chester, Pa.
Kilborn & Bishop Co., New Haven, Ct.
Marine Hardware & Equipment Co., So. Portland, Me.
Oneida Community, Kenwood, N. Y.
Seneca Chain Co., Kent, O.
Smith & Hemenway Co., 108-110 Duane St., New York.
Standard Chain Co., Pittsburgh, Pa.
W. & J. Tiebout, 118 Chambers St., N. Y.
Wilcox, Crittenden & Co., Inc., Middletown, Ct.
Links, Split—
Turner & Seymour Mfg. Co., Torrington, Ct.
Links, Strap—
W. J. Clark & Co., Salem, O.
Linoleum Machinery—
Farrel Foundry & Mach. Co., Ansonia, Ct.
Linotype Metal—
Theo. Hiertz Metal Co., St. Louis, Mo.
Merchant & Evans Co., Philadelphia, Pa.
Pittsburgh White Metal Co., Pittsburgh.
Lintles—
(See Architectural Sheet Metal Work.)
Loaders, Hay—
(See Haying Tools.)
Loaders, Horse, Car—
Kilbourne & Jacobs Mfg. Co., Columbus, O.
Loaders, Log—
Browning Engineering Co., Cleveland, O.
Soule Steam Feed Works, Meridian, Miss.

A Page from The Iron Age Directory of 1907.

to do are fully and accurately classified under nearly 7000 headings and more than 2000 cross references. The dimensions of the book, which has the usual striking red cover, are 6½ in. high and 4½ in. wide, making it a convenient size for reference and filing. As a live, up to date and especially complete compilation of Hardware and related manufactures the Directory will doubtless be heartily welcomed by the trade.

R. J. MASBACH, head of the Masbach Hardware Company, New York, will sail from New York June 11, accompanied by his family, on a pleasure trip, which will keep him abroad until next September. The tour will cover Germany, Switzerland and Northern Italy, returning by way of London and other points in the United Kingdom.

THE NATIONAL-NEW ENGLAND CONVENTIONS AT BOSTON.

THE programme for the joint annual conventions of the National Retail Hardware Association and New England Retail Hardware Dealers' Association, June 18-22, at Boston, has been determined. The gathering will be called to order on Tuesday morning, June 18, by Edward M. Bush, Evansville, Ind., president of the National Association. Addresses of welcome will be made by Governor Guild of Massachusetts, Mayor Fitzgerald of Boston, and John B. Hunter, president of the New England Association. This session will also be characterized by a formal address on "Our National Association," by ex-President W. P. Bogardus, Mt. Vernon, Ohio. The afternoon session will be of an executive character, and special features will be an address by H. T. Helgesen, Milton, N. D., on "Trade Boundaries"; report on the work of the Wholesale and Retail Joint Committee, by S. R. Miles, Mason City, Iowa, and reports by State Association secretaries.

On Wednesday, June 19, the two associations will hold separate executive sessions, and all will come together in the evening at the annual ladies' night banquet, an annual function with the New England Association. President Hunter of the New England body will act as toastmaster, and the following gentlemen are expected to make addresses: Lieutenant-Governor Eben S. Draper, Mayor John F. Fitzgerald, E. M. Bush, Charles E. Adams of the Massachusetts State Board of Trade, C. W. Asbury, president of the American Hardware Manufacturers' Association;

Rev. E. A. Horton, chaplain of the Massachusetts Senate, and Mrs. S. H. Thompson of Lowell, Mass.

Thursday, June 10, will see the two associations again in joint session. The morning will be occupied with a number of addresses by A. T. Anderson, Cleveland, secretary-treasurer of the National Supply and Machinery Dealers' Association, whose subject will be "Resale Prices"; J. H. Drury, Union Twist Drill Company, Athol, Mass., "Relation Between the Dealer and the Manufacturer"; Edgar Van Etten, vice-president of the New York Central & Hudson River Railroad, "Ethics of Rate Making"; M. L. Corey, Argos, Ind., secretary of the National Retail Hardware Association, and R. R. Williams, Hardware editor of *The Iron Age*. The afternoon will be largely devoted to the discussion of topics introduced through the medium of the Question Box.

Another joint executive session will be held on Friday, which will mark the close of what should prove an exceptionally interesting and enjoyable convention. F. Alexander Chandler, 36 Federal street, Boston, secretary of the New England Association, will be pleased to respond to any inquiries relative to the convention or the securing of hotel accommodations.

GEORGIA HARDWARE ASSOCIATION.

The annual convention of the Georgia Retail Hardware Association was held at Tifton on the 7th, 8th and 9th inst. The meeting was a most successful one, and was characterized by a large attendance and much enthusiasm. W. W. Robinson, Dublin, presided over the various sessions, Charles M. Tillman, McRae, occupying his place as secretary. A number of manufacturers and jobbers were represented, and some attractive Hardware exhibits were made.

Mayor Clyatt felicitously welcomed the Hardwaremen to the city, an appropriate response to his address being made for the association by G. W. Woodruff of Winder. Other addresses at the opening session were also made by L. A. Dietrich of the American Steel & Wire Company and C. L. Rierson of the Simmons Hardware Company.

Among the resolutions passed was one advocating the formation of a mutual fire insurance company by members of the association. Another resolution urged the members to prevail upon their Senators and Representatives in Congress to use their influence to defeat any bill looking to the establishment of a parcels post system.

The following officers were elected for the ensuing year: President, Charles M. Tillman, McRae; first vice-president, C. R. Thomas, Griffin; second vice-president, J. R. Hall, Moultrie; secretary-treasurer, Gary Vinson, Waynesboro; delegate to national convention at Boston, G. W. Woodruff, Winder; alternate, W. G. Raines, Statesboro. The Executive Committee comprises Charles M. Tillman, C. B. Thomas, J. R. Hall, Gary Vinson and W. H. Briggs.

The next meeting of the association will be held at Indian Springs, between May 15 and June 1, 1908, the exact date being determined by the Executive Committee.

On Thursday evening, May 9, the visiting Hardwaremen were the guests at a very enjoyable banquet tendered by a local committee of citizens. Among those who made addresses were Mayor S. M. Clyatt, who acted as toastmaster; H. F. Tift, H. B. Thomas, Judge R. Eve, R. W. Hatcher, John L. Herring and W. W. Banks.

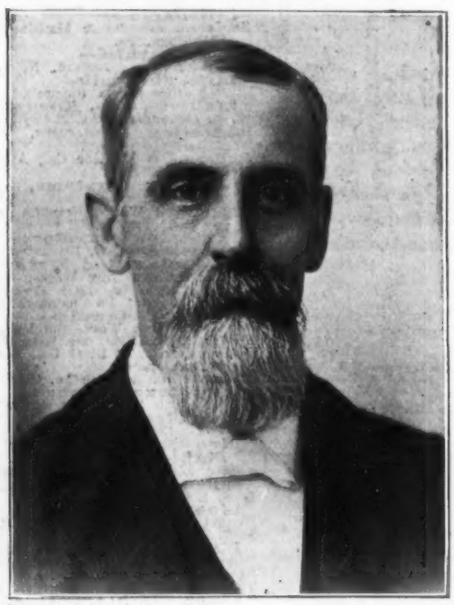
The Assaria Hardware Company, Assaria, Kan., has been incorporated with a capital of $16,000. It will conduct a retail business in Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils, Sporting Goods, Buggies and Harness.

After an existence of 35 years the Hardware business of Jacob Fisch & Sons, Muscatine, Iowa, has been discontinued, the owners having sold out the stock and retired from business on account of poor health. The entire stock was sold at retail and the firm has no successor.

DEATH OF D. P. BLISH.

D. P. BLISH, president of the Blish, Mize & Silliman Hardware Company, Atchison, Kan., died at his home in that city May 14. Although able to be up and around most of the time he had been an invalid for five years and had not taken an active interest in the business for seven years. Some weeks ago he fell on an ice coated porch at his residence and had been confined to his bed since.

David Parshall Blish was born at Stamford, N. Y., October 6, 1836, and in 1861 married Lucinda Silliman, who survives him. On January 1, 1871, the firm of Blish & Silliman having purchased the J. E. Wagner stock of Hardware, began business in Atchison. They conducted a retail business in the beginning, but soon commenced wholesaling to the small dealers in the new territory which was opening up to the west of Atchison. Associated with them was E. A. Mize. The three men were brothers-in-law, Mr. Blish and Mr. Mize having



D. P. BLISH.

married sisters of Mr. Silliman. The firm later became Blish, Mize & Silliman, continuing as such until the incorporation of the Blish, Mize & Silliman Hardware Company.

After the firm began wholesaling, Mr. Blish and Mr. Silliman did all the traveling for a time and covered most of the territory by teams. Mr. Blish remained on the road two years, enduring the hardships of commercial pioneering and forming friendships and acquaintances which have helped so materially to build up the reputation of the house, which now travels 17 men.

In his boyhood days Mr. Blish was a schoolmate of the late Jay Gould in New York State, and was one of the witnesses for the Gould family when an attempt was made after the great financier's death to divert part of his fortune. Always kind and courteous, Mr. Blish commanded universal respect and esteem. He was also a man of exceptional business ability, and his uniform fairness resulted in his keeping customers after getting them.

For more than a quarter of a century he had been senior warden of Trinity Episcopal Church, in Atchison, and he had been a member of the vestry almost since the first day of his arrival there.

THE Hardware Club of Council Bluffs, Iowa, recently gave a dinner in honor of T. N. Petersen, a fellow member, on the eve of his departure for an extended European trip. With P. C. De Vol, president of the Iowa Retail Hardware Association, as toastmaster, a pleasing programme of after dinner speeches upon timely trade topics was enjoyed.

Hardware Window Display

SEVENTH ARTICLE.

A CONSIDERATION of primary importance in window dressing is how most effectively to dispose of the floor space in the window. This is capable of treatment in several ways, but the best practice is against its being used flat except for exceptionally large goods. Few articles can be shown off to advantage on the flat floor of a window. An inclined plane will be found of greater utility or an incline in front with steps behind. Movable stands of this and other forms may easily be adapted to any window. They should be made

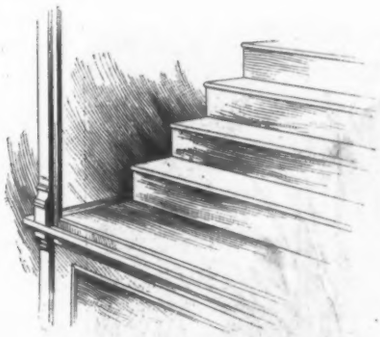


Fig. 20.—Terraced Steps.

complete in themselves and not attached to the solid floor so that they may be easily removed when a change in arrangements is desired.

Every Day Goods.

Goods in constant demand depend more for attractiveness upon the arrangement of the display than either novelties or season goods. Whether the articles displayed are laid upon the floor of a window or upon some elevation they should have an attractive background of color. A good way to accomplish this is by the use of cotton flannel or crepe paper, both of which are inexpensive and come in a variety of colors. In some cases material of higher quality and richer appearance will set off the goods to better advantage and enhance their value in the eyes of customers. For displaying such goods it is very desirable to have various forms of graduated display stands or adjustable racks, which may be covered with the material referred to, so that the different articles may be arranged with an eye to best effect and

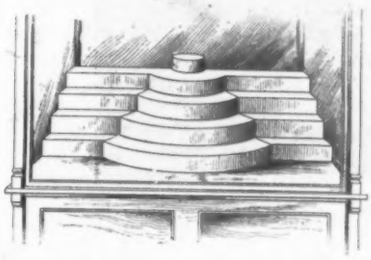


Fig. 21.—Combination of Straight and Semicircular Steps.

may be more distinctly seen. Such stands and racks may be stored somewhere in the building and brought out from time to time as required by the goods to be displayed.

Fig. 20 shows the variety of stepped display stand commonly used in a show window, while more elaborate forms can be devised, such as that with the semicircular center shown in Fig. 21. When covered with some rich looking material these stands afford a most effective background for Tools, Cutlery, Tin or Enameled Ware, Chafing Dishes, Five O'Clock Teas, &c. The stands may be made with wide tread and little rise, or with narrower tread and with considerable rise. The former style is better adapted to Mechanics' Tools, such as Pliers, Wrenches, Nail Sets, Screw Drivers, Auger Bits, &c., while the latter are better suited to taller articles, such as Fancy Tea and Coffee Pots, Cuspidors, Lamps, &c.

An inclined platform running part way back in the window with two or three steps in the rear, as in Fig. 22, makes a first rate background for many classes of goods. If used for Silver Plated Ware, for instance, Flat-

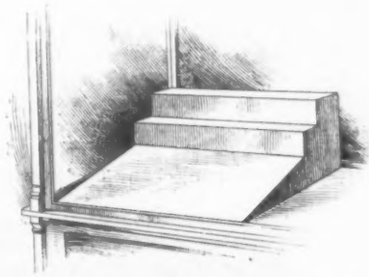


Fig. 22.—An Inclined Platform with Steps at the Back.

ware would be arranged on the inclined part and the steps behind would accommodate Hollow Ware. With Spoons, Forks, Knives, Butter Spreaders, &c., attractively grouped in front and Cake Baskets, Butter Dishes, Spoon Holders, Cream Pitchers, &c., on the steps a very attractive display can be arranged. The incline can also be used for the arrangement of very small articles to represent letters in spelling out words, figures, society emblems, &c. Society badges formed of Small Tools, Screws, or other articles will call forth commendation from people interested in such matters and often result in opening profitable business relations.

An excellent background for a display can be made by the use of boxes of different sizes and hights draped with material of suitable color, Fig. 23. Such a display would be a pleasing change from the usual conventional type,

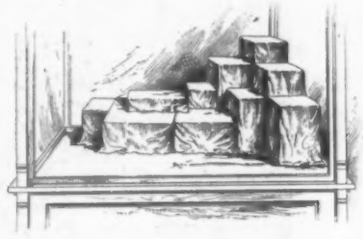


Fig. 23.—Background of Rough Boxes Draped with Cloth.

and would afford space for an attractive display of many classes of goods. Steps, stands, &c., may be made from damaged boxes or rough lumber as the covering used for the background will hide any imperfections in view.

(To be continued.)

WINDOW MONUMENT FOR MEMORIAL DAY

BY F. B. M.

TAKE an empty packing case for the base, selecting one that is in proportion to the size of your show window. Get a carpenter to surround the edges of the front and sides with molding, mitering the corners. Also have him make a tapering shaft out of half-inch stuff, say about four or five feet in hight, with a suitable apex, large enough to hold Flat Irons or Mason's Trowels. Place this shaft upon the base.

Any suitable inscription can be easily put on the front of the base, with large sized lead letters, such as pattern makers use. To place properly, draw lead pencil lines on the box the hight of the letters apart, lay the letters on the board loosely, and carefully space each letter. Then put spacing marks where each letter comes, so that you can replace the letters quickly and tell exactly where each comes.

Now remove the letters and cover the board with shellac between the lines where the letters are intended to go. This will stick them fast to the board by merely pressing them down upon its surface. As it is trans-

parent the spacing marks and lines will show through sufficiently to quickly arrange the letters.

The following inscription taken from a part of the fourth verse of the second chapter of Isaiah is certainly appropriate:

> *"And they shall beat their swords into ploughshares, and their spears into pruning hooks.*

A note opposite pruninghooks reads "or scythes."

Having completed the lettering, take and paint the monument over with a garnet colored paint, and while the paint is still wet sand it with white sand.

While it is not absolutely necessary to employ a painter or carpenter on this work, the writer believes in reciprocity, and that mechanics of various trades should be employed to assist the window dresser from time to time, as it all comes back to the merchant tenfold, by serving to interest them still more in your store and naturally enough in Mechanics' Tools and supplies handled.

While the monument is capable of being literally covered with all kinds of Hardware, as, for instance, Masons' Trowels or Flat Irons on the top, the shaft below could be covered with Hand Saws, Bits, Door Knobs, and the like. But the writer's idea would be to finish the monument in imitation of granite with the above inscription in raised letters as if hewn out of the solid rock.

The base might be surrounded with imitation of grass, the 1907 crop of which I have raised from wood excelsior, dipped in a pail of green diamond dye.[1] After dipping the excelsior should dry thoroughly, so that the color will not come off on the hands. The little ends should be pulled out, so as to stick up like blades of grass when placed in the floor of the window. Lay upon this lawn a number of Pruning Hooks or Scythes, and resting upon the grass and leaning up against each corner of the base of the monument should be Plowshares, one placed at each corner.

This will be found to be an effective display, and one readily prepared for Decoration Day.

AN ELABORATE FISHING TACKLE EXHIBIT.

DURING the season for Fishing Tackle the Union Hardware & Electric Supply Company, Providence, R. I., makes several exclusively Tackle window exhibits. Of these the first is always more elaborate than those which follow. The display reproduced herewith is the one which was used to initiate the season this year. Notwithstanding the unseasonable weather, the exhibit proved a winner and attracted the attention of many enthusiastic fishermen, numerous sales resulting, while an excellent foundation was laid for future inquiries.

Fishing Tackle Exhibit of Union Hardware & Electric Supply Company.

The window in which the display was made is about 9 ft. square. It was trimmed with green and white, and presented a striking appearance. At the four corners about 2 ft. from the glass were four posts supporting 4 c.p. electric lights. In the corners at the back were electric stars, which produced a very good effect. On the floor of the window were arranged fine reels, flies, hooks to gut and expensive rods. At the back were fastened lines, Sunday rods, bait, &c. A number of cards with clean cut lettering appeared in the window.

NOTEWORTHY SPRING ADVERTISEMENTS.

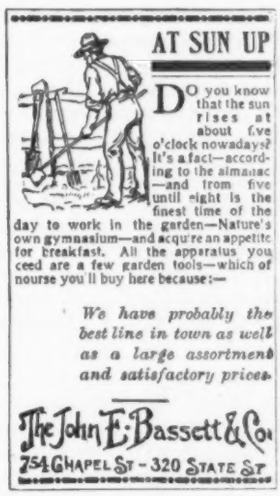
WE reproduce herewith three timely advertisements of The John E. Bassett & Co., New Haven, Conn. Two of them refer to spring outdoor requirements for lawn and garden, while the other relates to kitchen things, which are always interesting at the season when people are moving or setting up housekeeping.

The advertisements are marked by the effective arrangement and setup which are characteristic of the publicity of this house, and are written in the original and delightful style for which their author is well known. It would be difficult to present the subject of garden tools in a more attractive and appealing way than in the advertisement begining, "At Sun Up."

Some of the methods employed by this house in its newspaper advertising will doubtless interest many of our readers. In the first place except for special purposes the same size space is always used, and in a general way the company's advertisements may be said always to occupy the same position in each of the different local newspapers regularly employed. This practice cannot fail to be effective in commanding public attention, since almost any one will recognize and constantly observe anything partaking of the nature of a familiar feature whether in newspaper, window or any of the aspects that attract his attention from day to day.

An advantage in always using the same size space is apparent from the fact that all cuts can be made with this in view, and can thus be preserved with the certainty that they will meet future requirements. One of the advantages of this particular size is that the advertisement takes the shape of the ordinary mailing envelope, and can be reproduced in circular form and enclosed with invoices, statements, letters, &c., with good effect.

Copy is changed every other day, and here again the effectiveness of the company's system is apparent since the advertisements are so well written that readers of the daily papers who have a taste for such things are impelled to watch the familiar space employed for the sake of enjoying the well turned expression and attractive getup of the different ads. as they come along.


AT SUN UP
DO you know that the sun rises at about five o'clock nowadays? It's a fact—according to the almanac—and from five until eight is the finest time of the day to work in the garden—Nature's own gymnasium—and acquire an appetite for breakfast. All the apparatus you need are a few garden tools—which of nourse you'll buy here because:—
We have probably the best line in town as well as a large assortment and satisfactory prices.
The John E. Bassett & Co.
754 CHAPEL ST - 320 STATE ST

In the Domain of the Cook.
Most folks hereabouts know all about the Hardware and Cutlery we sell—they don't all know about our Kitchen Things. But folks who do—the Elect—say nice things about them. One Lecturer on Cooking told us that she knew of no store in New York which carried all the things we had. Sometime when you want some good Cooking Ware—Something Different—try us. We will probably have it—if we haven't, we'll get it.
You'll find Here a pretty good place to find most Household Ware.
The John E. Bassett & Co.
754 CHAPEL ST.- 320 STATE ST.

Spring Hosiery
(For the Garden)
ALTHOUGH we may have a few more frosts and snow storms before the Fourth of July, the Winter is practically over. Weather such as we've had would drive even inanimate things to drink, and the little green sprouting things get pretty thirsty between showers. So it's time to get out the garden hose and soak 'em occasionally.
If you need a new Hose we have it—lots of it—the best possible for the price anywhere, in a dozen grades from
10 cents a foot up.
Phone us for a Price List.
The John E. Bassett & Co.
754 CHAPEL ST.- 320 STATE ST.

Several Spring Advertisements (Reduced in Size) of the John E. Bassett & Co.

THE LINCOLN STOVE REPAIR COMPANY, Lincoln, Neb., has been organized with a capital stock of $25,000, to handle a complete line of Stove Repairs. The officers are: O. J. Allison, president; T. F. Bartlett, vice-president; Ernest Hoppe, treasurer; George G. Waite, secretary.

A. B. TURNER, Bradshaw, Neb., has succeeded to the Hardware, Stove, Implement, Paint and Furniture business of Turner & Cline.

THE STANDARD ARMS COMPANY.

CAPITALISTS interested in the Standard Arms Company, incorporated with a capital stock of $1,000,000, held a meeting in Wilmington, Del., on the 16th inst., and effected an organization by electing the following officers: President, Edwin S. Cramp, of the Cramp Shipbuilding Company, of Philadelphia; vice-president and general manager, W. K. du Pont, of Wilmington; secretary, W. D. Condit, of Philadelphia; directors, Edwin S. Cramp, W. K. du Pont, W. D. Condit, and Hon. Ben T. Cable, of Rock Island, Ill. The new company has purchased a plant at Wilmington, for manufacturing Fire Arms. The plant is practically new, and is admirably adapted for the purpose. The special machinery to be used by the company has already been selected and will be ordered at once, and the work of installation rushed as rapidly as possible. The company's specialty will be the manufacture of Automatic and Hand-Operated Rifles, under the Smith-Condit patents, which have been purchased by the company. The solid breech of the Smith-Condit Automatic Rifle, it is stated, insures safety, and permits the use of high-pressure standard sporting and military ammunition; the rigid, nonrecoiling barrel insures accuracy, and the adjustment for instantly increasing or decreasing the operating power insures reliability of action. The Rifle has been thoroughly tested for sporting and military purposes and the company will solicit both commercial and Government trade. The plant will be equipped at once for an output of 50 Rifles per day, and about 150 men will be employed. As the demand increases, the company will make necessary extensions to the plant, as there is ample capital back of the project. The company has an office in the Land Title Building, Philadelphia.

CHANDLER & FARQUHAR COMPANY'S ANNUAL BANQUET.

THE second annual banquet, given by the Chandler & Farquhar Company, Boston, to its employees, was held at the American House, Boston, May 16. It was a very much enjoyed occasion and constituted a fitting close to the series of "trade talks," which the company has conducted during the winter and spring. While the banquet cannot be regarded quite as an anniversary celebration, it is interesting to note that the business will be 25 years old in July. The important event of the evening was the presentation to Charles S. Farquhar, sole surviving original partner, by the employees of the company of a beautiful gold watch, suitably inscribed, as a reminder of the high esteem in which he is held by every one.

Trade and Customs in Java.

The following advices have been received from John L. Sardy, who is making a business trip around the world.

JAVA has been called the richest island in the world, and among its richest men are the Chinese merchants, who show their aptitude for business in marked contrast to the native Javanese, who are totally unqualified as traders, but useful as customers, being the fly entangled in the Chinese web. They are the laborers, and if the Javanese quadrupeds had a labor union there would certainly be a strike, as these natives do not confine themselves to work commonly performed by human beings, but indulge in such diverting pastimes as hauling heavily laden wagons, towing canal boats, &c., besides doing a general freight business in two baskets slung on a stick across their shoulders.

The white people, of course, are practically all Dutch, good, solid Dutchmen, solid financially and physically, polite and agreeable to mingle with, and clear headed men of affairs.

Low-Priced Goods Are in Most Demand.

The chief towns are Batavia, at the west end of the island, and Sourabaya, on the east. The former has a larger European population, but the latter a larger population of Javanese, Chinese, Arabs, &c. The total population of the island is about twenty-five millions. The large Asiatic and small European population necessarily confines the great bulk of imports to those articles used by the former. For such trade the cheapest goods are required. At the same time there are excellent European stores, where goods of merit, and of all sorts, can be bought, for your Dutchman is not mean, and spends his guilders freely. There is a jewelry establishment in Batavia which would be a credit to any metropolitan city in any part of the world. The wealthy Dutch owner is not afraid to stock articles of great value, and does not care to handle anything just because it is cheap.

There are numerous Hardware stores, mostly small, run by Chinese. The most pretentious, however, is a German one, in which practically all the articles dealt in are of German manufacture. American Hardware, of course, finds a sale here, but not to the extent that German and English makes enjoy. Commercial travelers from these two countries are more frequent than from the United States, and a goodly number of import firms are German.

Travelers Must Be Industrious and Patient.

Business routine is carried on at peculiar hours. The European merchants begin at ten and conclude at four o'clock. The fashionable retail stores are open in the morning at seven and close at eight in the evening, but between one and five o'clock the proprietor has luncheon or "tiffin," as it is called, and afterward goes to sleep. Thus it happens that any one in quest of orders from both the merchants and the shop keepers can gratify his ambition by working from seven in the morning until eight at night.

The enterprising commercial drummer accustomed to American ways has in Java an opportunity of acquiring valuable lessons in patience. The Dutch method may be sure, but it is certainly slow. Import firms as a rule do not place orders for their own stock, but may allow the exhibition of travelers' samples in their warehouse and call in the Chinese dealers, who in turn may give orders on the line.

In Batavia, large factories do not exist. Human machinery being plentiful and understood, is the means employed for the limited manufacturing carried on.

A Unique Steam Railroad

For many years a steam surface railroad has been running through Batavia, which is unique in this respect that the engine is operated without any fire, force being obtained from steam supplied at the terminal station and stored at high pressure in the engine boiler, from which it is allowed to pass into a smaller receptacle and thence to the cylinders. In one respect at least this system is better than the New York elevated trains as in comparison it is almost noiseless.

The Indispensable Bamboo and Its Use in Razors, Scythes, etc.

There is a sale for Razors in Java, as the Javanese are great shavers, but they must be cheap to enter into competition with the native made article, which sometimes consists of a bottle which a woman will break in such a way that she can use the sharp edge as a Razor with which to shave her child's head, and, what is more, she can make a Safety Razor of it by holding her fingers along the edge, so that it will shave without cutting the skin. Bamboo is also turned into a Razor, the native having the art of putting a cutting edge on it sufficient to shave with. The same material is also used to make Scythes, and it is wonderful to see how deftly the Javanese mower does his work with this crude agricultural implement. It would be difficult to say what the native would do without bamboo. It is used for a hundred and one purposes, including food, as it is cooked in curry, and such curry! There is everything in it including snake!

There is a chance in Java for an American trust. The island produces the bulk of the quinine bark of the world, and as there are only a few plantations it should not be a difficult matter to form a combination. Here's an opportunity for some of our astute money makers.

Locks Unnecessary.

Locks are not a necessity in Java, so far as a safeguard against theft is concerned. Houses are left open in perfect security, and bureau drawers are seldom kept locked. The tale is told of a drunken plantation manager, who went off on a spree, leaving 50,000 guilders in an unlocked drawer. When he returned after an absence of several days everything was intact; not a guilder had been touched.

Revenge a Marked Characteristic.

There is another characteristic of the natives of Java, however, which is not so commendable. They are cruel and revengeful to an extreme degree. In Java there are a number of native races, four of which are Malay, Soendanese, Javanese and Madoerese. The Malays are the worst, being shifty, extremely treacherous and revengeful. The Madoerese is a strong second, but braver. Never strike any of these natives without a just cause. If he deserves the hiding, well and good, nothing happens; but if, on the other hand, the chastisement is unmerited, then woe betide you!

He is ingenious in his methods of getting even, but sure to kill you or some one you love. Sometimes he will use a knife, but poison is generally preferred. For that agreeable means of getting rid of you, he sometimes uses a fine, hairlike substance which grows on bamboo; this he mixes with your food, and in time it develops a deadly disease, which invariably has a fatal termination. The great advantage of this method is that death cannot be traced to poison.

Another ingenious way he has is to insert a poisonous snake, and they have plenty in Java, in a bamboo, with his head projecting from the open end. The snake being fastened inside is, of course, furious, and the moment you or any of the family get in reach he bites, and the victim is done for.

Another plan is to blow a powder called Ketjoeboen into your sleeping room, generally through the keyhole. This makes you insensible and an easy prey to the revenge sought after. The wretch comes in naked and oiled, so even if you were to be awake, the chances are you could not hold him. As a more cruel form of revenge, instead of killing you, he selects your wife or child.

Cruelty Another Trait.

Their cruelty is shown in every day life. The drivers glory in beating the little Javanese ponies, and the dogs

in truth lead "a dog's life." One method of treating a dog to be disposed of is to saturate a sponge with something sweet. This induces the dog to swallow it, and, as the sweet stuff makes the poor beast thirsty he drinks, the sponge swells up inside and the dog bursts.

Costume Simplicity.

The Javanese husband is not worried about his wife's dressmaker' bills, nor does she lie awake nights thinking up new gowns. In the matter of costume simplicity is the first consideration and modesty only an afterthought. In this market a clothing manufacturer would be driven to drink, and a shoeman would regret his occupation.

Instead of chewing gum the native belle prefers the betel nut, which stains her mouth a hideous red, and the native beau continually smokes cigarettes, which he makes by rolling a small quantity of so-called tobacco in a native leaf, the cigarette itself being remarkable for its small size and big smell.

A Nation of Bathers.

The Tji-liwoeng canal runs from the mountains of the Preanger Province, about four hours by rail from Batavia, to Priok and for commercial purposes is used to transport freight from Batavia to the shipping port of Priok. It flows through the center of Batavia and is the native public bath, and very public at that. It is also the Batavian Laundry, Unlimited, and from daybreak to nightfall its banks are lined with dusky washerwomen, young and old, pretty and ugly, who wash clothes awhile and then turn to and wash themselves. There never were such people for bathing. They are at it morning, noon and night. The bathing costume is so simple it is a wonder other people have not thought of it before. With the men it amounts to about 1 per cent., with the women 2 per cent., and with the children no per cent. at all.

Nor is this disregard for the feelings of sensitive people confined to the natives. The Dutchmen, it is true, attend to business fully attired, but their wives and sweethearts, their sisters and mothers, have other ideas, the result of which is a semi-native costume of two garments and a pair of slippers, but no stockings. The upper garment is a thin white muslin sacque called a Cabaya, the other or lower dress is the Sarang and is made of a cotton cloth wonderfully stamped by native art with birds, flowers, and grotesque figures in bewildering colors. In shape it is simply a bag open at both ends and perhaps 5 ft. in diameter. Whether it is the fashion to get into this bag feet first or head first is a matter of conjecture, but into it these sedate Dutchwomen most certainly arrive and there they stay all day. Before dinner, which takes place about half past eight, this costume is changed for the evening dress of society.

Debtors Go to Jail.

Debtors are put in jail and kept there until the obligation is either paid to or compromised by the creditor. It costs the creditor one guilder per day for the keep of the debtor while in jail. This money is payable in advance, falling due every 28 days. If the creditor fail to pay before noon on the twenty-eighth day, the debtor goes free, and cannot be imprisoned again until a fresh sentence be passed upon him. Proceedings are usually commenced by protesting an overdue acceptance, but if in the meantime the debtor declares himself bankrupt he cannot be put in jail except for fraudulent bankruptcy. Relatives or friends generally pay the debt rather than see the debtor go to jail.

The object of this law is to prevent stealing by getting goods on credit and not paying when the bill becomes due, although able to do so. Your Dutchman is no fool; he understands how to manage the natives and when necessary how to fight them.

Simple Custom House Methods.

He also understands business and is wise enough not to put obstacles in the way of trade. For instance, a traveller coming in with samples is not delayed or bothered in the custom house. All he has to do is to produce his invoice of the samples, whereupon a perfunctory examination of his trunks takes place and he pays in cash the not over-heavy duty. This money is carefully sealed in an envelope bearing his name and put away. Upon departure there is no more red tape to go through than upon arrival, merely to go to the custom house with your samples and your money is at once handed back to you intact. It would be a benefit to commerce if similar simplicity existed in some other parts of the world, British India for instance, where not only a good deal of time is lost in making the customs entry, but it is months and months after departure before the duty is refunded and then 5 per cent. is retained by the Government.

REQUESTS FOR CATALOGUES, &c.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM KING & SMITH COMPANY., which has succeeded King, Mills & Co., in Tilamook, Ore., I. C. Smith having purchased the interest of W. Mills. The company handles Shelf Hardware, Stoves, Tinware, Paints, Oils, Sporting Goods, Bicycles, Doors, Windows and Glass.

FROM FARMERS' HARDWARE & IMPLEMENT COMPANY, which has been incorporated with a capital stock of $10,000, in Hydro, Okla. The company does a retail business in Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Sporting Goods, Wind Mills and Harvesting Machinery.

FROM SKEATOOK HARDWARE & FURNITURE COMPANY, Skeatook, Okla., conducting a retail business in Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, and Sporting Goods.

FROM CHAMPION SUPPLY & HARDWARE COMPANY, L. P. Schaefer and John Holl, proprietors, who have just embarked in the Hardware, factory and blacksmith supply business at Springfield, Ohio.

FROM BUCK & GREENE, St. Albans, Vt., who have formed a partnership to carry on a retail business in general Hardware, Stoves, Tinware, Paints and Plumbing.

FROM THE ALVA CLAPP HARDWARE COMPANY, Atchison, Kan., which has been incorporated with a capital stock of $10,000, to deal in Shelf and Heavy Hardware, Stoves, Tinware, Paints, Sporting Goods, &c.

FROM JOHN MCNAMARA, Orangeburg, S. C., who hat for some years been manager for J. W. Smoak, and will embark in the Hardware, Paint, Stove, Implement and Plumbing business early in the fall.

FROM N. EDBERG, who has bought the Hardware, Stove, Paint, Sporting Goods and Furniture business of J. O. Walker & Co., Ong, Neb.

FROM C. S. THOMAS, who has opened up a new stock in Breckenridge, Mo. He will carry lines of Shelf and Heavy Hardware, Agricultural Implements, Paints, Oils and Sporting Goods.

FROM BLOSSER & SON, Moulton, Iowa, who carry Shelf and Heavy Hardware, Agricultural Implements, Sporting and Athletic Goods and Sewing Machines.

FROM PALMER HARDWARE COMPANY, successor to Monett Hardware Company, Monett, Mo., carrying lines of Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Sporting Goods and Queensware.

FROM MORRIS & BROTHERS, who have purchased the business of O. L. Porter & Co., in Saxman, Kan., and will carry Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils and Sporting Goods. The firm expects to erect a brick building, 40 x 80 ft.

Export Trade Topics.

PRACTICAL SUGGESTIONS ON EXPORT TRADE.

Sixth Article.—Collection of Accounts.

COMING now to the question of how to recover the value of invoices shipped for the account of foreign customers, it may be said that the manufacturer who has received an order for shipment direct to a foreign customer will find one of the following means of payment provided for:

1. The customer may have remitted cash in full with his order.

2. He may have provided for payment in cash by a banker in New York, or elsewhere, "against presentation of shipping documents."

3. He may wish to carry an open account with the manufacturer.

4. He may desire the manufacturer to draw upon him for the amount involved.

It is a hardship on a foreign customer to require him to remit cash with his order or even to open a credit in New York for the payment of his invoices when goods have been shipped. In both cases expense is involved which is not only a nuisance, but increases the normal cost of the goods. On the other hand a considerable and an unusual risk is involved in starting an "open account" with a foreign client. Hence the more usual custom is to draw upon the customer, but before taking up that method of doing business, certain other facts should be noted.

"Letters of Credit" with New York Bankers

are not invariably exactly what might be expected from the term. For example, a letter of credit from a Chinese customer is really only an authorization for the banker in New York to negotiate a draft up to the amount named on the customer in question. Without such a so-called letter of credit bankers usually decline to handle similar drafts on China or Japan. But the fact of the existence of such a letter and the subsequent cashing of a draft under it by the New York banker does not release the drawer of that draft from responsibility in case it is not honored by the drawee. Instances of default in payment under such circumstances are, however, very rare indeed.

Confirmed Credits.

When customers have advised that payment for their invoices will be effected by New York bankers "upon presentation of shipping documents," care must in the first instance be exercised to make certain that the bankers named have indeed received such instructions, that they are in order and that the bankers hold themselves ready to pay as and to the amount specified. In the case of what is called a "confirmed credit," this notification will be given by the banker on his own initiative. Sometimes, however, bankers have not been instructed to "confirm" a credit, and failing to receive such confirmation within a reasonable time it is necessary for the manufacturer to inquire of the banker as to the facts, sometimes even to insist by cable or by letter that the customer give supplementary instructions to "confirm."

Credits such as that just referred to are sometimes opened with London instead of New York bankers, especially by remote or colonial merchants. This is usually done to avoid high charges for exchange or interest, and the proceedings in such cases fall under the general subject of drawing drafts. A London banker's credit, if confirmed, is equally as safe and desirable as a New York credit. The advantage of a draft so drawn over a draft drawn directly on customer is the increased or unquestionable financial responsibility of the drawee. Just what is meant by "documents" will be explained when the subject of drafts is reached.

Open Accounts.

Open accounts with foreign customers should be discouraged and usually declined. This does not deny the fact that some manufacturers have carried such accounts for years and with reputed satisfactory results. A great deal has been printed of late in the way of criticism of American manufacturers because of their unwillingness to meet the long credit terms said to be extended in their export relations by our rival manufacturing nations, particularly Germany. From high quarters, deserving respect, American manufacturers have been urged to grant longer terms to their foreign customers. The criticism involved is partly justified. But it must not be imagined that the longer credits in question should be or are, even in the case of competing nations, on open account terms. On the contrary the very basis of all export relations, no matter between what parts of the world, is and ought to continue to be the exchange of merchandise for cash or for securities judged as good as cash, such as the acceptances of financially responsible customers.

Germany does indeed grant terms of four months, six months, sometimes very much longer, but the German exporter's goods are rarely delivered to customers until the latter have signed acceptances at the agreed upon term for the invoice value involved. In some instances, in the case of big and rich houses of world-wide fame, or those personally and favorably known to the shippers, the convenience of an open account may be extended by Americans or Germans with advantage to all concerned. But the principle of export business is the exchange of merchandise for securities and is and ought to be but rarely deviated from.

The American house that imports foreign goods into our own country is seldom able to obtain possession of those goods until it has paid for them or given its acceptance for them. We are now leaving entirely out of consideration reciprocal import and export relations between the same houses. Differences of race, blood, moral and mental attributes, and codes of commercial practice and honor differ so materially in different parts of the world that for these reasons alone existing practices should be maintained and open credits sparingly extended.

Foreign Drafts.

Probably nine-tenths of all American export business is on the basis of "draft attached to shipping documents." This is an entirely satisfactory way of conducting the business whenever the standing and character of the foreign merchant is understood. And, as a matter of fact, the effort of the manufacturer who seeks export business should be directed and virtually confined to those houses that he has learned of as responsible and desirable. With such houses little hesitation need be felt in shipping subject to draft. Others and entirely unknown houses may very properly be required to supply "confirmed credits," because shipments subject to the payment of a draft may result in a large or even a total loss in the case of irresponsible or tricky correspondents.

"Documents."

What are "documents?" Those usually presented include: Original and duplicate draft; original and duplicate (negotiable copies) bills of lading; original and duplicate invoice; and either one copy or duplicate copies of insurance certificate and packing list. These papers constitute the usual "full set of shipping documents," and should be pinned together to avoid loss or separation.

Consular invoices or other documents may be required in some cases, as to which no general rule can be given. As already noted, the bills of lading and insurance certificates should be endorsed, usually and preferably in blank when documents are presented to a bank for discount or collection. Drafts that are to be negotiated with bankers in this country are usually drawn: "Pay to the order of *ourselves*," and are then also endorsed in blank. Drafts may be drawn payable at sight or at 30, 60, or 90 days after sight. Payable at so and so many days from *date* is less usual, results in no advantage as a rule, and is better avoided.

While any number of days or months sight may be specified it will be found, if it is desired to discount the draft, that considerable difficulty will be experienced in negotiating a longer term than 90 days with New York bankers. As a courtesy to the foreign customer a draft is

sometimes drawn at three days' sight instead of merely at sight. The effect is practically the same thing, although rates of exchange are not quite so good, but the drawee has an opportunity of arranging for the payment which might possibly otherwise cause some little inconvenience.

Kinds of Foreign Drafts.

Foreign drafts are of two sorts commonly known as "d. a." and "d. p."—that is, documents for acceptance and documents for payment. These terms are not expressed on the face of the drafts, but should be clearly and expressly specified in a letter of instruction accompanying the drafts and documents to the bankers who negotiate or forward them. Sight drafts must, of course, be "documents for payment." As formerly noted, the possession of a properly indorsed bill of lading really conveys title to the goods. Hence such a bill of lading passed to a banker remains his property to be surrendered to the customer only when the latter complies with the terms of payment of the accompanying draft.

If the instructions to the banker are to deliver the documents—that is, principally the bill of lading—to the customer only against payment of the accompanying draft, it matters not the least whether that draft is at sight or at 90 days' sight so far as the security to the drawer of the draft, the manufacturer himself, is concerned. The customer cannot get his bill of lading or his goods until he has paid his draft.

The only object that a customer can have in demanding a time draft instead of a sight draft when it is understood that documents will be surrendered only against payment, is to offset the longer time required for the freight steamer to deliver the goods than for more rapid mails to deliver draft and documents; in other words, to defer the necessity of payment for the goods until approximately their arrival in his port. However, it is common practice for bankers in many parts of the world outside of Europe to hold even nominally "sight" drafts at the request of consignees, only presenting them when the ship bringing the goods arrives in port. It therefore follows that time drafts, those at 30, 60, 90 or any other number of days after sight are more frequently "documents for acceptance."

Facilities Afforded by Drafts "D. A."

By this is meant that bankers are instructed to surrender the bill of lading and other documents to the drawee, giving him title to and possession of the goods as soon as he indorses or "accepts" the accompanying draft. The latter then becomes an ordinary "acceptance" or promissory note, to be treated accordingly, usually retained by the presenting bank to be collected upon maturity. The extension of facilities of this nature to foreign customers may usually be considered by the manufacturer rather more favorably than similar domestic problems. If anything, payments of acceptances are more sure and usual in most foreign countries than in the United States as credit instead of cash systems are more frequent abroad.

The distinction between a documentary foreign draft and the "clean" drafts, so-called, that American manufacturers often draw on customers in this country for overdue accounts, must be clearly recognized. There is no relation between the two. And an accepted foreign draft in the hands of a banker usually means more when dishonored in a foreign country than does even the protest of an unpaid note of hand in our own country. However, ordinary precautions are by no means to be neglected in these instances, and it should be especially noted that native houses in the Orient, both in the Near and the Far East, have by no means the same scruples as to dishonored acceptances that prevail with European houses established among them.

This Form of Giving Credit,

or rather of extending time is one that might with advantage be largely extended by American manufacturers. Our European competitors, notably the Germans, have enjoyed certain advantages over us in this respect. German bankers, for instance, have in the past been quite willing to discount any quantity of such paper for German manufacturers, with or without documents attached, and even at four or six months' terms. However, it is understood that this practice has been greatly restricted in the last few years. As we shall see, the extension of say 90 days' time to a foreign customer against his acceptance does not necessarily imply that the manufacturer will lose the use of his money for that or for any other length of time. On the other hand, in such cases, as well as with sight drafts, it is altogether possible for him to encash immediately the full amount of his invoice.

(To be continued.)

PRICE-LISTS, CIRCULARS, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

MILLERS FALLS COMPANY, 28 Warren street, New York: Catalogue No. 30, illustrating with prices the goods formerly manufactured by the company, and in addition new tools, as follows: Corner Bit Brace, Extension Bit Holder, Hand Drill, Breast Drill, Star Chucks, Coping Saw and Miter Box.

MIAMI CYCLE & MFG. COMPANY, Middletown, Ohio: Catalogues devoted to Racycle, Miami and Junior Bicycles and to the Motor Racycle.

ANDREWS WIRE & IRON WORKS, Rockford, Ill.: Printed matter referring to the Vrooman Sink Strainer, with hook to fasten strainer into corner of sink; also its Half Bushel and Bushel Wire Baskets.

JOHN STORTZ & SON, 210 Vine street, Philadelphia, Pa.: Combined catalogue containing illustrations and prices of goods manufactured by them. These include Plumbers' and Tinners' Tools, Ice Tools, Oyster Knives and Tools, Crate Hammers and Hatchets, Box and Bale Hooks, Cement and Concrete Workers' Tools, Contractors' and Pavers' Tools, &c.

H. B. RUSLER, Johnstown, Ohio: Illustrated pamphlets referring to the Comet Force and Spraying Pump and Spraying Nozzles, and giving valuable hints on spraying.

THE A. S. NOONAN TOOL & MACHINE WORKS, Rome, N. Y., illustrated 28-page booklet of Automobile, Motor Cycle and Bicycle Tools and Specialties, showing many time and labor saving devices for both manufacturing and repair work.

FT. SMITH WAGON COMPANY, Ft. Smith, Ark.: Illustrated catalogue and price-list of Ft. Smith Farm, Lumber, Log and Light Wagons.

READING STANDARD COMPANY, Reading, Pa.: Illustrated catalogue of R. S. Motor Bicycles; also catalogue of Reading Standard Bicycles.

PORT HURON COMPANY, Port Huron, Mich.: Large illustrated catalogue referring to the Powerful Roller and other road making machines; also booklets referring respectively to Grain Threshers, Wood Sawing Machinery, general purpose Engines, Corn Shellers, &c.

BURLINGTON BASKET COMPANY, Burlington, Iowa: General catalogue illustrating and listing an extensive line of Market, Clothes, Hamper, Corn and Satchel Baskets, and Hawkeye Refrigerator Baskets.

TOPLIFF & ELY COMPANY, Elyria, Ohio: Catalogue and price-list of Doll Carriages and Go-Carts, Children's Wheelbarrows, Wire Doll Furniture, &c.

SAM'L C. TATUM COMPANY, Cincinnati, Ohio: Catalogue No. 20, referring to Neverbreak and Automatic Clamps, Dinner Boxes, Paper Bag and Twine Holders, Letter Boxes, Store Trucks, Dumb Bells, Shot for throwing, &c.; also catalogue No. 21, referring to Merchants' Broom Holders, Twine Boxes, Paper Bag and Twine Holders and Store Trucks.

FRASER HOLLOW SPAR & BOAT COMPANY, Greenport, L. I.: 1907 catalogue referring to Skiffs, Rowboats, Power Boats and Launches; also catalogue of Canoes.

MICHIGAN STEEL BOAT COMPANY, Detroit, Mich.: Attractive illustrated catalogue of Steel Pleasure Boats.

MISCELLANEOUS NOTES.

The Babcock Mfg. Company.

The Babcock Mfg. Company, Leonardsville, N. Y., is manufacturing a low down potato harvester, having a divided shovel and four driving wheels. The separator apron is 6 in. wider than the plows, and the potatoes are separated low. The pole is 10 in. above the front axle, thus making the line of draft straight from the whiffletrees to hame tugs. The company is also manufacturing a line of spring tooth harrows, including a wheel spring tooth harrow.

Repair Outfit for Bibs.

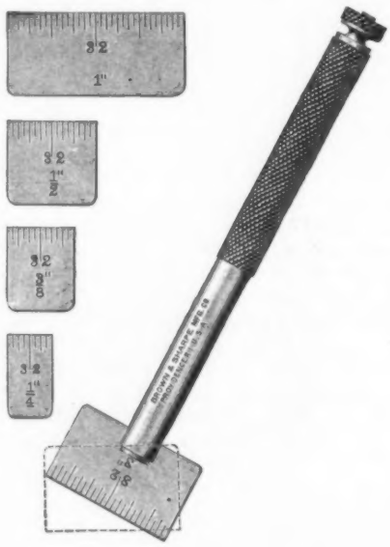
Good Mfg. Company, 88-92 Lincoln avenue, New York, N. Y., is marketing a useful and practical repair outfit for renewing washers on bibs, as here shown. The assortment of brass screws and nuts, 72 of each, is contained in a neat, decorated, hinged cover metal box, 4½ x 2¾ x ⅞ in., in which, as now made, there are 18 compartments. The screws vary in length, diameter, and number of threads per inch, and the nuts include square, hexagon and round shapes, with variations in threads. This combination is designed primarily as a compact,

Screw and Nut Repair Outfit for Bibs.

portable repair outfit for plumbers' use either in shop or out on a job, the combined styles and sizes having been selected with a view to fitting any bib made by any of the various manufacturers in this country. It is also equally serviceable as a hardware specialty to be sold over the counter to the individual. The point made by this company, which manufactures large lines of plumbers' specialties in great variety, in brass and rubber, for the plumbing trade, is the time saved by a journeyman at work away from the shop by always having permanently in his kit such commonly needed parts, thereby avoiding vexatious delays.

Interchangeable Steel Rules.

The Interchangeable steel rules with holder shown in the accompanying cut are convenient when the ordinary rule cannot be used, as in measuring a recess or keyway, as well as in the general class of tool and die work. The holder takes either of the five sizes of rules, the lengths being ¼, ⅜, ½, ¾ and 1 in. The barrel is knurled for finger grip. The rules are held in a split chuck ad-

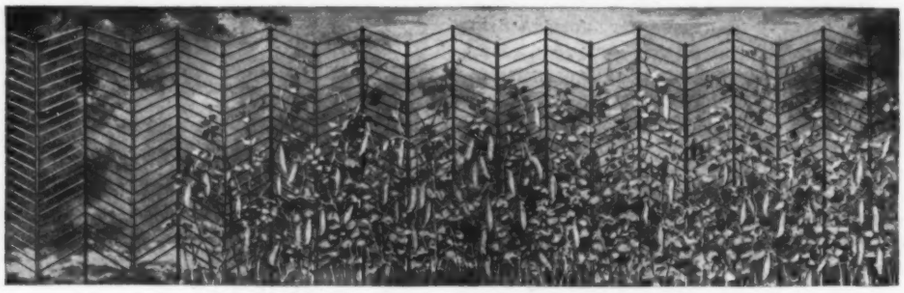


Interchangeable Steel Rules with Holder.

justed by a knurled nut at the top of the barrel, and can be set at various angles according to the work. The rules are of tempered steel, graduated on both sides, as follows: 32ds on one side and 64ths on the other, and 50ths on one side and 100ths on the other. The equipment is manufactured by the Brown & Sharpe Mfg. Company, Providence, R. I.

The Nondestructible Pea Trellis.

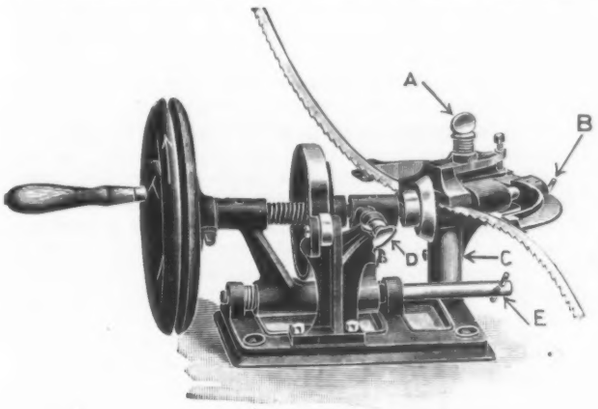
The Clinton Wire Cloth Company, Clinton, Mass., is introducing the pea trellis shown herewith. It is made of hard galvanized steel wire, the upright parts of which are heavier than the cross wires, and at the base extend 12 in. below the bottom cross wire. At the intersections of the wires they are electrically welded, fusing the two strips of metal into one, making it impossible to loosen or to pull them apart. The company is manufacturing the trellis in any desired hight, made up in sections 10 ft. in length, the hight best adapted for garden peas being 5 ft. Among points of excellence the following are mentioned: That it is superior to the use of brush; that it is neat in appearance and affords an excellent support for the vines; that fire has no effect upon it; that it cannot rot, and that when properly placed the wind cannot blow it over. The method of setting up the trellis is simple, and it can be easily taken down, while in a space 6 x 10 ft. 100 10-ft. lengths may be accommodated for the winter.



The Nondestructible Pea Trellis.

Ideal Band Saw Sharpener.

The Rotary File & Machine Company, 589 Kent avenue, Brooklyn, N. Y., is offering the band saw sharpener shown herewith. The machine is operated by hand or power, and is particularly designed for the use of small users of band saws, with one or two saws a week to sharpen. At each revolution of the file shaft the rotary file is automatically withdrawn from engagement with a tooth, dropped back, and just as the smooth portion of its circumference reaches the saw it rushes the saw

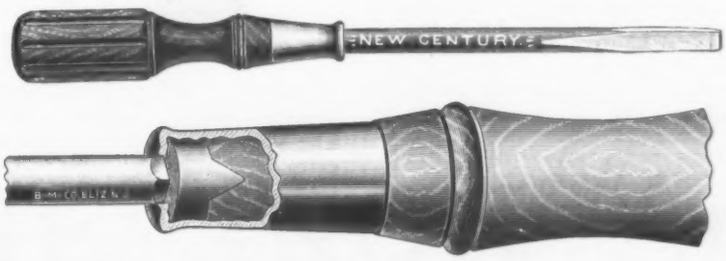


Ideal Band Saw Sharpener.

along for the next tooth. The amount of this movement is regulated according to the size of the saw tooth by a thumb screw. The file only cuts to a certain depth each time, and this feature always insures accurate and even teeth. The construction of the vise makes it possible for a thick weld, and in fact, almost anything but a break to pass through the vise without stopping the machine or injuring a tooth. The machine will save three-fourths or more of the time of hand filing because it is entirely automatic and only requires the time necessary to put in a saw and start the machine.

The New Century Screw Driver.

Braunsdorf-Mueller Company, Elizabeth, N. J., has improved its New Century screw driver by the use of the sliding toothed bolster shown in the lower of the accompanying cuts. The lock keys the blade to the handle, so that when the handle is turned the blade must follow. The upper cut shows the finished appearance of the screw driver, which is referred to as being exactly balanced, strong, lean, lithe and attractive in appearance. The handle, it is said, cannot break. The sliding toothed bolster is also used by the company in its ice picks and carpenters' chisels.



New Century Screw Driver.

Witch Safety Razor.

The Fremont Crescent Metal & Mfg. Company, Fremont, Ohio, is putting on the market the so-called Enchantment line of safety razors, which includes the Witch razor, shown in Fig. 1. As indicated in the cut, 10 blades are furnished with the razor, together with a stropping device with which they can be resharpened. The blades are said to be made of the best razor steel, hand stropped and hair tested. They are clamped their entire length, and it is declared cannot work loose, twist or get out of order in any way, although they are easy

Fig. 1.—Witch Safety Razor, with Blades.

to take out and replace. The razor consists of only two pieces, the blade and the handle, and no attachments whatever are needed. The blade holders are made of special noncorroding metal, which is warranted proof against rust. Fig. 2 shows the method of inserting a blade, which is done by simply slipping it in and closing

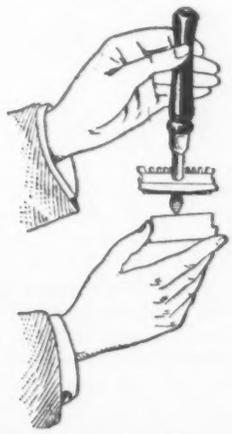


Fig. 2.—Witch Safety Razor, Inserting Blade.

a lever. To remove the blade the lever is raised and the blade will drop out, as in Fig. 3. The company also has ready for the market the Wizard razor, which is of heavier material and has solid metal handles. This is offered with 12 or 24 blade cases.

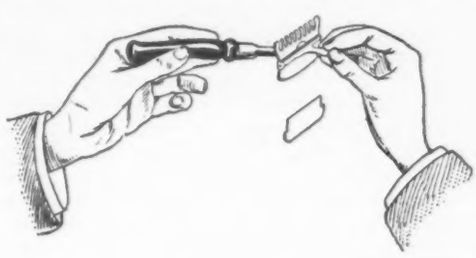


Fig. 3.—Witch Safety Razor, Removing Blade.

Bent Rung Ladders.

Indiana Bent Rung Ladder Company, Indiana, Pa., represented by the Boggs Hardware Company, 23 Warren street, New York City, is manufacturing the bent rung ladders here illustrated, in addition to other similar goods in the line. The distinctive feature of this style of ladder consists of a semitubular wrought steel brace inserted in a recess on the inner sides of the ladder, and

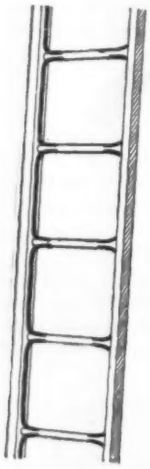


Fig. 1.—Single Bent Rung Ladder.

Fig. 2.—Double Columbia Step Ladder.

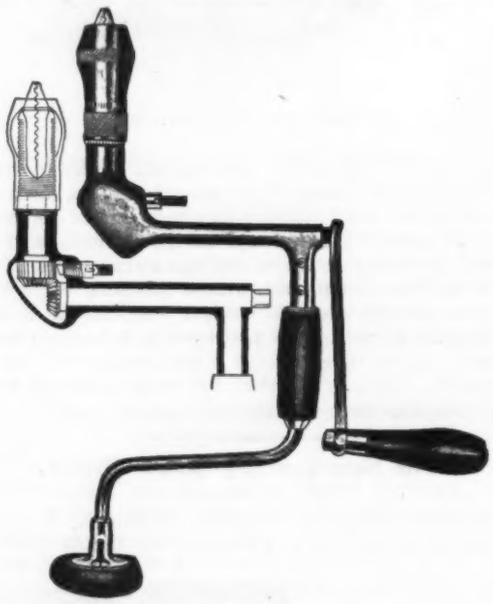
bent at right angles at each end and clinched to the top and bottom of each step or rung. While greatly strengthening this form of construction, it also adds to the rigidity and strength by not boring holes in the sides to hold the rungs, which sometimes weakens a ladder where the breaking point occurs, at the junction of steps and sides. It is said by the company that with its patented semitubular wrought steel brace this objection is overcome, as the brace strengthens the steps and rungs where the greatest strain occurs. It is also remarked that the knee or angle on the brace serves to transmit the strain on

Fig. 3.—Single Columbia Step Ladder.

the side pieces in a downward direction. It is asserted that the brace not only strengthens the individual step or rungs and side section, where it is placed, but that the series of braces distribute the weight throughout the entire ladder, thus relieving the rung directly beneath of the weight of much of the strain. The principle of applying the brace to step ladders is the same as to rung ladders, except that the knee or angle is flattened to conform to the flat surface of the step; otherwise the brace is semitubular. The ladders are constructed throughout of selected basswood, Norway pine, &c., for the sides, and of selected hickory or oak for the rungs and steps. Fig. 1 represents the new model, single bent rung ladder, weighing but 1¼ lb. to the foot, and each step will carry safely, it is said, 250 lb. It is made in 12, 14, and 16 in. widths, and all sizes up to 22 ft., inclusive. The company apply an automatic clutch to its extension ladder. Another form of this construction is an extension ladder made in series from 8 to 22 ft. each section, the longest extension ladder extending 41 ft. There is also a sectional ladder embodying similar principles as to rungs and sides. Fig. 2 illustrates the double Columbia step ladder, being a double ladder with steps on one side and rungs on the other. The patent wire leg brace, seen in detail in Fig. 3, keeps the ladder stiff and at the same time allows it to conform itself to any unevenness of floor, thereby preventing "walking." This ladder is made in lengths from 3 to 20 ft., inclusive. Fig. 3 shows the single Columbia step ladder, similar to the ladder illustrated in Fig. 2, except that it has a plain back. This ladder is made in 3 to 20 ft. lengths and has a bucket shelf.

Lancaster Combination Corner Brace.

The Lancaster Machine & Knife Works, Lancaster, N. Y., is placing on the market the Lancaster combination corner brace herewith illustrated. It is a combination of a ratchet, straight and corner brace said to be of the highest grade material, workmanship and finish, highly polished and nickel plated. The tool is made only



Lancaster Combination Corner Brace.

in the 10-in. size, has a ball bearing head and cocobolo head and handle, the head being shaped square on one side, so that it will fit into a corner and force the bit to drive at a true right angle. The chuck is designed to take any size of square shank bit or the smaller sizes of round shank drills, which it will hold firmly. There is no lost motion. It has a positive drive and it is claimed will work easily and fast and drive the bit true at any angle with great power. It is particularly handy in nearly all positions that a ratchet brace is used in, and in place of the half or quarter sweep of the brace, by using this tool in connection with the extra handle the manufacturers believe that considerably more work can be accomplished. The tool is especially adapted for electricians, cabinet makers, builders and for rapid screw driving. By removing the screws at the handle and the upper part of the tool it can be placed in many difficult positions and with an extension holder for the extra handle can be worked in almost any out of the way place the operator may desire to work with it. The weight is just about the same as the ordinary ratchet brace, being just 3 lb. complete with the handle. The case between the chuck and the handle is of aluminum and made amply heavy to insure strength and rigidity. It is driven by two machine cut gears inclosed in this case, which is dustproof and permanently closed. Used as a simple ratchet brace the tool is operated either right or left by a pawl, and it can be locked securely when it is desired to use it as a straight brace.

Auto Refrigerator Basket.

The accompanying cut represents the No. 2 Hawkeye auto refrigerator basket, which has been added to the line made by the Burlington Basket Company, Burlington, Iowa. It is referred to as a good looking, strong and light weight rattan basket with an ice compartment and a metal lining between which and the rattan body of the basket there is a layer of asbestos packing and a layer of felt. As the lids and bottom are made in the same way and a strip of felt is piped all around the edge of the lids it is claimed that when they are closed down and the straps fastened the basket is practically air tight. The design here shown is said to be roomy enough to carry provisions for a large automobile party or for an extended tour. The basket is fitted with two leather straps and lock buckles with which it can be firmly attached to the footboard of an automobile. The lock buckles prevent any one from opening or removing the basket except the one who holds the keys. Baskets are regularly furnished in imitation of dark cherry, but at slightly additional cost can be made in any desired color to match a car. The No. 2 size is 25 in. long, 14 in. wide and 10 in. deep. A No. 1 basket 20 in. in length is also made. Special baskets of any size or design will be made to order. Dull finished rubber covers for the baskets are also offered.

Hawkeye Auto Refrigerator Basket.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	℔ gal.
Linseed, City, raw	44 @45
City, Boiled	45 @46
State and Western, raw	42 @43
Raw Calcutta, in bbls.	70 @..
Lard, Extra Prime, Winter	76 @77
Extra No. 1	56 @57
No. 1	49 @52
Cotton-seed, Crude, f.o.b. mills	41 @45
Summer Yellow, Prime	56 @56½
Summer White	@58
Yellow Winter	@58
Sperm, Crude	50 @60
Natural Winter	72 @73
Bleached Winter	75 @76
Bleached Winter, Extra	@..
Tallow, Prime	60 @61
Whale, Crude	35 @36
Natural Winter	46 @47
Bleached Winter	48 @49
Extra Bleached Winter	50 @51
Menhaden, Brown, Strained	32 @33
Light Strained	32 @33
Northern	26 @27
Southern	26 @27
Cocoanut, Ceylon ℔	9⅝@ 9¾
Cochin ℔	10½@10¾
Cod, Domestic, Prime	36 @38
Newfoundland	40 @42
Red, Elaine	47 @50
Saponified ℔	6¾@ 7
Palm, Logos ℔	7 @ 7¼
Olive, Italian, bbls., Yellow	87½@1.00
Neatsfoot, Prime	56 @57

Mineral Oils—

	℔ gal.
Black, 29 gravity, 25@30 cold test	11¼@12
29 gravity, 15 cold test	12¼@13½
Summer	11½@12
Cylinder, light filtered	19 @20
Dark, filtered	16½@17½
Paraffine, 903-907 gravity	14 @14½
903 gravity	13 @13½
883 gravity	10¾@11¼
Red	13 @14½

Miscellaneous—

Barytes:		
White, Foreign ℔ ton	$18.50@20.50	
Amer, floated ℔ ton	19.00@20.00	
Off color ℔ ton	13.00@16.50	
Chalk, in bulk ℔ ton	3.00@ 3.25	
In bbls. ℔ 100 ℔	....@ .35	
China Clay, Imported ℔ ton	11.00@17.50	
Cobalt, Oxide ℔ 100 ℔	2.50@ 2.60	
Whiting, Commercial ℔ 100 ℔	.43@ .52	
Gilders ℔ 100 ℔	.55@ .65	
Ex. Gilders ℔ 100 ℔	.60@ .65	

Putty, Commercial—℔ 100 ℔

In bladders	$1.70 @1.85
In bbls. or tubs	1.20 @1.45
In 1 ℔ to 5 ℔ cans	2.65 @2.95
In 12½ to 50 ℔ cans	1.50 @1.90

Spirits Turpentine—℔ gal.

In Oil bbls.	63½@64
In machine bbls.	64 @64¼

Glue—

	℔ ℔
Cabinet	12 @15
Common Bone	7½@ 9
Extra White	18 @24
Foot Stock, White	12 @14
Foot Stock, Brown	9 @11
German Hide	12 @18
French	10 @40
Irish	13 @16
Low Grade	10 @12
Medium White	14 @17

Gum Shellac—

	℔ ℔
Bleached, Commercial	45 @46
Bone, Dry	56 @57
Button	40 @50
Diamond I.	59 @60
Fine Orange	52 @57
A. C. Garnet	46 @47
Kala Button	35 @36
D. C.	62 @63
Octagon B.	56 @57
T. N.	45 @48
V. S. O.	59 @60

Colors in Oil—

	℔ ℔
Black, Lampblack	12 @14
Blue, Chinese	36 @46
Blue, Prussian	32 @36
Blue, Ultramarine	13 @16
Brown, Vandyke	11 @14
Green, Chrome	12 @16
Green, Paris	@24
Sienna, Raw	12 @15
Sienna, Burnt	13 @15
Umber, Raw	11 @14
Umber, Burnt	11 @14

White Lead, Zinc, &c.—

	℔ ℔
Lead, English white, in Oil	9⅝@10
Lead, American White:	
Lots of 500 ℔ or over, in Oil	@ 7½
Lots less than 500 ℔, in Oil	@ 8
Lead, White, in oil, 25 ℔ tin pails, add to keg price	@ ⅛
Lead, White, in oil, 12½ ℔ tin pails, add to keg price	@ 1
Lead, White, in oil, 1 to 5 ℔ assorted tins, add to keg price	@ 1½
Lead, American, Terms: For lots 12 tons and over ¼¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.	
Zinc, American, dry	5⅝@ 5½
Zinc, French:	
Antwerp, Red Seal, dry	8¾
Antwerp, Green Seal, dry	10¾
Paris, Red Seal, dry	9¾
Paris, Green Seal, dry	11
Zinc, V. M. French, in Poppy Oil:	
Green Seal:	
Lots of 1 ton and over	13¼@13⅝
Lots of less than 1 ton	13⅝@13⅞
Zinc, V. M. French, in Poppy Oil:	
Red Seal:	
Lots of 1 ton and over	11⅞@12⅜
Lots of less than 1 ton	12⅜@12⅝

Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

Dry Colors—

	℔ ℔
Black, Carbon	6¼@10
Black Drop, American	3½@ 8
Black Drop, English	5 @15
Black, Ivory	16 @20
Lamp, Com	4 @ 6
Blue, Celestial	4 @ 6
Blue, Chinese	30 @33
Blue, Prussian	28 @32
Blue, Ultramarine	4½@15
Brown, Spanish	½@ 1
Carmine, No. 40	$3.10@3.25
Green, Chrome, ordinary	3½@ 7
Green, Chrome, pure	17 @25
Lead, Red, bbls., ½ bbls., kegs	@ 7¾
Litharge, bbls., ½ bls., kegs	@ 7¾
Ocher, American ℔ ton	$8.50@16.00
American Golden	2½@ 3¼
French	1¼@ 2
Foreign Golden	3 @ 4
Orange Mineral, English	10 @12
French	11 @12
German	12 @12
American	8¾@ 9
Red, Indian, English	4½@ 6
American	3 @ 3¼
Red, Turkey, English	4 @10
Red, Tuscan, English	7 @10
Red, Venetian, Amer. ℔ 100 ℔	$0.50@1.25
English ℔ 100 ℔	$1.15@1.60
Sienna, Italian, Burnt and Powdered	3 @ 6
Italian, Raw, Powdered	3 @ 7
American, Raw	1¼@ 2
American Burnt and Pow'd.	1¼@ 2
Talc, French ℔ ton	$18.00@25.00
American ℔ ton	15.00@25.00
Terra Alba, French ℔ 100 ℔	.90@ 1.00
English ℔ 100 ℔	.80@ 1.00
American ℔ 100 ℔, No. 1	.75@ .80
American ℔ 100 ℔, No. 2	.60@ .65
Umber, Turkey, Bnt. & Pow.	2 @ 3¼
Turkey, Raw and Powdered	2¼@ 3½
Burnt, American	1½@ 2
Raw, American	1½@ 2
Yellow Chrome, Pure	12 @14
Vermilion, American Lead	7 @25
Quicksilver, bulk	65 @..
Quicksilver, bags	@60
English, Imported	65 @70
Chinese	$0.90@1.00

THE IRON AGE

The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.

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Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1906, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Domestic, ₱ doz. $3.00.....33⅓%
North's 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition— See *Caps, Cartridges, Shells, &c.*

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, ₱ doz. pairs, Nos. 1, $0.75; 2, $0.60; 4, $1.00; 5, $0.50.
Fernald Quick Shifter, ₱ doz. pairs .....$2.00@$3.00

Anvils—American—

Eagle Anvils.....₱ lb @8½¢
Hay-Budden, Wrought.....9½@9¾¢
Trenton .....₱ lb 9½@9¾¢

Imported—

Peter Wright & Sons, ₱ lb, 84 to 349 lb, 11¢; 350 to 600 lb, 11½¢.

Anvil, Vise and Drill—

Millers Falls Co., $18.00.....15&10%

Apple Parers— See *Parers, Apple, &c.*

Aprons, Blacksmiths'—

Livingston Nail Co.....33⅓%

Augers and Bits—

Com. Double Spur..70&5@70&10%
Jennings' Patn., rey. finish....60&5@60&10%
Black Lip or Blued...65@65&5%
Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....40&10%
Ford's Auger and Car Bits.....40&5%
Ft. Washington Auger Co., Conard's 35%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jennings' list..25%
No. 30, R. Jennings' list.....40&7½%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%
Wright's Jennings' Bits.....50%

Bit Stock Drills— See *Drills, Twist.*

Expansive Bits—

Clark's small, $18; large, $26....50&10%
Clark's Pattern, No. 1, ₱ doz. $28; No. 2, $18.....60&10&10%
Ford's, Clark's Pattern.....60%
C. E. Jennings & Co., Steer's Pat..25%
Lavigne Pat., small size, $18.00; large size, $26.00.....60&10&10%
Swan's 60%

Gimlet Bits—

Per gro.
Common Dble. Cut....$3.00@3.25
German Pattern, Nos. 1 to 10, $4.75; 11 to 13, $5.75

Hollow Augers—

Bonney Pat., per doz..$5.50@6.00
Ames .....25&10%
Universal 20%
Wood's Universal.....25%

Ship Augers and Bits—

Ship Augers.....40&10%
Ford's .....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's 15%
Watrous' .....33⅓&7½%
Snell's 40%

Awl Hafts— See *Handles, Mechanics' Tool.*

Awls—

Brad Awls:
Handled .....gro. $2.75@3.00
Unhdled, Shldered..gro.63@66¢
Unhandled, Patent..gro.66@70¢
Peg Awls:
Unhandled, Patent..gro. 31@34¢
Unhdled, Shldered..gro. 65@70¢
Scratch Awls:
Handled, Com...gro. $3.50@4.00
Handled, Socket..gro.$11.50@12.00

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

Single Bit, base weights: Per doz.
First Quality.....$4.75@5.00
Second Quality.....$4.25@4.50
Double Bit, base weights:
First Quality.....$7.00@7.50
Second Quality.....$6.50@6.75

Axle Grease— See *Grease, Axle*

Axles— *Iron or Steel*

Concord, Loose Collar..4½@5 ¢
Concord, Solid Collar...4¾@5¼¢
No. 1 Common, Loose..3½@4 ¢
No. 1¼ Com., New Style3¾@4¼¢
No. 2 Solid Collar.....3¾@4¼¢
Half Patent:
Nos. 7, 8, 11 and 12....70@75%
Nos. 13 to 14.....70@75%
Nos. 15 to 18.....75@75&5%
Nos. 19 to 22.....75@75&5%

Boxes, Axle—

Common and Concord, not turned lb., 4½@5¢
Common and Concord, turned. lb., 5½@6¢
Half Patent.....lb., 9½@10¢

Bait— Fishing—

Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%

Balances— Sash—

Caldwell new list.....50%
Pullman .....50&10&10%

Spring—

Spring Balances.....50&10@60%
Chatillon's:
Light Spg. Balances.....50@50&10%
Straight Balances.....40@40&10%
Circular Balances.....50&10%
Large Dial.....30%

Barb Wire— See *Wire, Barb.*

Bars— Crow—

Steel Crowbars, 10 to 40 lb.... per lb., 2¾@3¢

Towel -

No. 10 Ideal, Nickel Plate..₱ gro. $8.50

Beams, Scale—

Scale Beams.....40%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ₱ doz. $0.80; Tinned $0.85
No. 11 Wire Coppered ₱ doz. $1.15; Tinned $1.20
No. 10 Wire Tinned.....₱ doz. $1.50
Western W. G. Co.:
No. 1 Electric.....₱ gro. $7.80
No. 2 Buffalo.....₱ gro. $9.00
No. 3 Perfection Dust.....₱ gro. $8.00

Egg—

Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd, $0.80; No. A, Jap'd, $1.15; No. B, Jap'd, $1.85; No. 6, Jap'd, $1.65.
Lyon, Jap'd, per doz., No. 2, $1.35.
Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, $5.00; No. 75, $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.00; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $7.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $25.00.
Turner & Seymour Mfg. Co.:
T. & S. Dover.....$6.00
Western, W. G. Co., ₱ gro., Buffalo, No. 2, $8.00; Perfection, No. 3, $9.00.
Wonder (R M. Co.)..₱ gro, net, $6.25

Bellows—

Blacksmith, Standard List..
Split Leather.....65%
Grain Leather.....60%

Hand—

Inch..	*6*	*7*	*8*	*9*	*10*	Net Prices.
Doz...	*$5.50*	*6.15*	*6.60*	*7.15*	*7.70*	

Molders—

Inch..	*9*	*10*	*11*	*12*	*14*	Net Prices.
Doz...	*$8.00*	*9.00*	*10.50*	*12.50*	*14.50*	

Bells— Cow—

Ordinary Goods..75&5@75&10&5%
High grade.....70&10@75%
Jersey .....75&10%
Texas Star.....50%

Door—

Abbe's Gong.....40@40&10%
Barton Gong.....50%
Home, R. & E. Mfg.s Co.'s.....55&10%
Trip Gong.....50@60&10%
Yankee Gong.....40&10@50%

Hand—

Polished, Brass.....50@50&10%
White Metal.....50@50&5%
Nickel Plated.....40&10@50%
Swiss .....50&10@50&10&5%
Cone's Globe Hand Bells.....30½@35%
Silver Chime.....25@30%

Miscellaneous—

Farm Bells.....lb., 2¼@2½¢
Church and School.....60%
Table Call Bells.....50@50&10%

Belting— Leather—

Extra Heavy, Short Lap..60&5%
Regular Short Lap....60&10&5%
Standard 70%
Light Standard.....70&5%
Cut Leather Lacing.....45%
Leather Lacing Sides, per sq. ft. 25¢

Rubber—

Agricultural (Low Grade)..... 75@75&5%
Common Standard....70@70&10%
Standard .....60&5@60&10%
Extra .....60@60&5%
High Grade.....50&5@50&10%

Bench Stops— See *Stops, Bench*

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender.....40%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $20.50.
Green River Tire Benders and Upsetters 20%

Bicycle Goods—

John S. Leng's Son & Co.'s 1907 list: Chain, Parts, Spokes.....50%
Tubes 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks— Tackle—

Common Wooden.....75%
Hartz St. Tackle Blocks.....50@50&5%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50&10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50&10%; Wire Rope Snatch, 50%.
Lane's Patent Automatic Lock and Junior 50%
Stowell's Novelty, Mal. Iron.....50%
Stowell's Loading.....50&10%
See also Machines, Hoisting.

Boards, Stove—

Paper and Wood Lined.....40%
Embossed 50%

Boards, Wash— See *Washboards.*

Bobs, Plumb—

Keuffel & Esser Co.....33⅓%

Bolts—

Carriage, Machine, &c.—

Common Carriage (cut thread): ⅝ × 6 and smaller..70&12½@—%
Larger and Longer..60&2½@—%
Phila. Eagle, $3.00 list May 21, '99 90%
Bolt Ends.....65@65&5%
Machine, ⅜ & ¼ and smaller.. 70&12½@—%
Machine, larger and longer.. 60&7½@—%

Door and Shutter—

Cast Iron Barrel, Japanned, Round Brass Knob:

Inch	*3*	*4*	*5*	*6*	*8*
Per doz.	*$0.30*	*.35*	*.45*	*.60*	*.80*

Cast Iron Spring Foot, Jap'd:

Inch	*6*	*8*	*10*
Per doz.	*$1.20*	*1.50*	*2.25*

Cast Iron Chain, Flat, Japanned:

Inch	*6*	*8*	*10*
Per doz	*$1.00*	*1.40*	*1.65*

Cast Iron Flat Shutter, Jap'd., Brass Knobs:

Inch	*6*	*8*	*10*
Per doz	*$0.75*	*.95*	*1.25*

Wrought Barrel Japd..80@80&10%
Barrel Bronzed.....60&10%
Spring .....70&10@70&10&10%
Shutter .....50&5@50&10&5%
Square Neck.....75@75&10%
Square .....70&10&10%
Ives' Patent Door.....50%

Plow and Stove—

Plow .....65&10@—%
Stove .....85@85&5%

Tire—

Common Iron.....80%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Eclipse, list Dec. 28, '99.....80%
Mount Carmel Bolt Co.:
Norway Phila., list Oct. 16, '84....80%
Eagle Phila., list Oct. 16, '84....82½%
Mount Carmel, list Dec. 28, '99....80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct., '84.....80%
Shelton Co.:
Tiger Brand, list Dec. 28, '99.....80%
Phila., Eagle, list Oct. 16, 1884..82½%
Upson Nut Co.:
Tire Bolts.....72½%

Borers, Tap—

Borers Tap, Ring, with Handle:

Inch	*1¼*	*1½*	*1¾*	*2*
Per doz	*$4.80*	*5.60*	*6.40*	*8.00*
Inch	*2¼*	*2½*		
Per doz	*$8.65*	*11.50*		

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.75; No. 3, $2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.....30%
Langdon, New Langdon and Langdon Improved, 20&10%; Langdon Acme .....15&10%
Perfection 40%
Seavey 40%
Stanley R. & L. Co.: Nos. 240 to 460, 30%; Nos. 50 and 60.....35%

Braces—

Common Ball, American..$1.25@1.30
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 414 .....60%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat...50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat.60@60&5%
Stanley R. & L. Co.:
Stanley, 35%; Victor.....45%

Brackets—

Wrought Steel.....70&10@75&10%
Griffin's Pressed Steel.75&10@75&10&5%
Griffin's Folding Brackets.....70&10%
Stowell's Cast Shelf, 75%; Sink..50%
Western, W. G. Co., Wire.....60&10%

Bright Wire Goods— See *Wire and Wire Goods.*

Broilers—

Kilbourne Mfg. Co.....75&20%
Western, W. G. Co.....80%
Wire Goods Co.....75@75&10%

Buckets, Galvanized—

M'f'gr's list, price per gross.

Quart	*10*	*12*	*14*	
Water, Reg.	*25.35*	*28.00*	*32.00*	*1045%*
Water, Hvy.	*45.35*	*48.00*	*52.00*	
Fire, Rd. Btm.	*32.00*	*34.65*	*38.65*	
Well	*37.35*	*41.35*	*45.35*	

Bucks, Saw—

Hoosier.....₱ gro. $36.00

Bull Rings—See *Rings, Bull*

Butts— Brass—

Wrought, High List, Oct. 26, '06. 45@45&10%
Cast Brass, Tiebout's.....40%

Cast Iron—

Fast Joint, Broad....40&10@50%
Fast Joint, Narrow...40&10@50%
Loose Joint.....70&10@75%
Loose Pin.....70&10@75%
Mayer's Hinges.....70@70&5
Parliament Butts.....70@70&5

Wrought Steel— *Discount*

Reversible and Broad.....70&5%
Light Reversible, Light Narrow .....70&5%
Loose Joint, Narrow, Light Inside Blind, etc.....70%
Back Flaps, Table Chest....65%

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, 10%; 1200, 25%; 200, 300, 600, 800 .....40%

Hendryx Bronze; Series 700, 800..40%
Hendryx Enameled.....40%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong, per lb., 4¼@4¾¢
Sharp, 1 prong, per lb., 4¾@5¼¢
Burke's Blunt, 4¼@4¾¢; Sharp, 4¾@5¼¢
Gautier, Blunt, 4@4¼¢; Sharp, 4½@4¾¢
Perkins', Blunt, ₱ lb, 3.65¢; Sharp, 4.15¢

Can Openers—See *Openers, Can.*

Cans, Milk—

	5	8	10 gal.
Illinois Pattern	$1.35	1.85	2.35 each.
New York Pattern	1.50	2.20	2.45 each.
Baltimore Pattern	1.50	2.20	2.45 each.
Dubuque	1.35	1.60	1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:

3	5	10 gal.
$48.00	60.00	129.60 gro., net.

Caps, Percussion—

Eley's E. B.....52@55¢
G. D.....per M 34@35¢
F. L.....per M 40@42¢
G. E.....per M 48@50¢
Musket.....per M 62@63¢

Primers—

Berdan Primers, $2 per M..20&5%
Primer Shells and Bullets..15&10%
All other primers per M.$1.52@1.60

Cartridges—

Blank Cartridges:
32 C. F., $5.50.....10&5%
38 C. F., $7.00.....10&5%
22 cal. Rim, $1.50.....10&5%
32 cal. Rim, $2.75.....10&5%
B. B. Caps, Can. Ball, Swgd.$1.90
B. B. Caps, Round Ball....$1.49
Central Fire.....25%
Target and Sporting Rifle..15&5%
Primed Shells and Bullets.15&10%
Rim Fire, Sporting.....50%
Rim Fire, Military.....15&5%

Casters—

Bed.....65&10%
Plate.....60&5%
Philadelphia.....70&10%
Acme, Ball Bearing.....33⅓%
Boss.....70&10%
Boss Anti-Friction.....70&10%
Gem (Roller Bearing).....80%
Martin's Patent (Phoenix).....45%
Standard Ball Bearing.....45%
Tucker's Patent low list.....30%
Yale (Double Wheel) low list.....50%

Cattle Leaders—See *Leaders, Cattle.*

Chain, Proof Coil—

American Coil, Straight Link:

5-16	¼	5-16	⅜	7-16	½	9-16
$8.77	6.17	5.02	4.57	4.37	4.27	4.22

⅝	¾	⅞ to 1	1⅛ to 1¼ inch.
5½.17	4.07	4.02	4.12

In cask lots, deduct 25¢.
German Coil.....60&10&10@70%

Halter—

Halter Chains.....60@60&5%
German Pattern Halter Chains, list July 24, '97.....60&10&5%
Covert Mfg. Co.
Halter.....35&8%

Cow Ties—See *Halters and Ties.*

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6½—6-3, Straight, with ring..$28.00
6½—6-2, Straight, with ring..$29.00
6½—8-2, Straight, with ring..$32.00
6½—10-2, Str'ght, with ring..$37.00

NOTE.—Add 2c per pair for Hooks. Twist Traces; add per pair for Nos. 2 and 3, 2c; No. 1, 3c; No. 0, 4c to price of Straight Link.

Eastern Standard Traces, Wagon Chain, &c.....60%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron.....60&10%
Brass.....50&10%
Safety and Plumbers' Chain, 60&10%
Gal. Pump Chain.....lb. 4@4½%
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion.....40%
Oneida Community:
American Halter, Dog and Kennel Chains.....35&2½@40%
Niagara Dog Leads and Kennel Chains.....45@50&5%
Wire Goods Co.:
Dog Chain.....70&10%
Universal Dbl.-Jointed Chain.....50%

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain.....60%
Pullman:
Bronze Chain, 60%; Steel Chain, 60&10%
Sash Chain Attachments, per set..8¢
Aluminoy Sash Ribbon, per 100 ft.....$1.25@$3.00
Sash Ribbon Attachments, per set.8¢

Chalk—(From Jobbers.)

Carpenters' Blue....gro., 50@55¢
Carpenters' Red.....gro., 45@50¢
Carpenters' White...gro., 40@45¢

Checks, Door—

Bardsley's.....45%
Pullman, per gro.....$54.00
Russwin.....33⅓%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....55%
Youths' Chests, with Tools.....10%
Gentlemen's Chests, with Tools..37½%
Farmers', Carpenters,' etc., Chests, with Tools.....2½%
Machinists' and Pipe Fitters' Chests, Empty.....50%
Tool Cabinets.....50%
C. E. Jennings & Co.'s Machinists' Tool Chests.....33⅓&10%

Chisels—

Socket Framing and Firmer

Standard List.....70&10@75%
Buck Bros.....30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....60%
Socket Framing No. 15.....60%
Swan's.....66⅔@70%
L. & I. J. White Co.....30@30&5%

Tanged—

Tanged Firmers.....30&5@35%
Buck Bros.....30%
C. E. Jennings & Co. Nos. 191, 181..25%
L. & I. J. White Co.....25&5%

Cold—lb.

Cold Chisels, good quality..13@15¢
Cold Chisels, fair quality..11@12¢
Cold Chisels, ordinary...9@10¢

Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck.....40%
Beach Pat., each $8.00.....35&5%
Empire.....25%
Blacksmiths'.....25%
Jacobs' Drill Chucks.....35%
Pratt's Positive Drive.....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....40%
Universal, Reversible Jaws.....40%
Combination, Reversible Jaws.....40%
Drill Chucks, New Model, 25%; Standard, 40&10%; Skinner Pat., 25%; Positive Drive.....40%
Planer Chucks.....25%
Face Plate Jaws.....40%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21.....35%
Scroll Combination, Nos. 82 and 84.....30%
Geared Scroll, Nos. 33, 34 and 35..30%
Independent Iron, Nos. 18 and 318.35%
Independent Steel, No. 64.....25%
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104.....35%
Union Czar Drill.....25%
Universal 11, 12, 16, 17, 13, 14, 15..35%
Universal, No. 42.....30%
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50.....35%
Steel Face Plate Jaws, Nos. 70 and 72.....30%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....60%

Clamps—

Adjustable, Hammers'.....20@20&5%
Carriage Makers', P., S. & W. Co.....40&10@50%
Resly, Parallel.....33⅓&10%
Myers' Hay Rack.....45%
Lineman's, Utica Drop Forge & Tool Co.....40%
Wood Workers, Hammers'.....40&10%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain—

Iwan's Champion, Adjustable.....55%
Iwan's Champion, Stationary.....45%

Sidewalk—

Star Socket, All Steel, ₱ doz. $4.05 net
Star Shank, All Steel, ₱ doz. $3.24 net
W. & C. Shank, All Steel, ₱ doz., 7½ in., $3.00; 9 in., $3.25.

Cleavers, Butchers'—

Foster Bros.....30%
Fayette R. Plumb.....30%
L. & I. J. White Co.....30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Company:
1902 Chicago Horse, each..$10.75
20th Century Horse, each..$5.00
Lightning Belt Horse, each.$15.00
Chicago Belt Horse, each.$20.00
Stewart's Enclosed Gear Horse, each.....$6.75
Stewart's Patent Sheep Shearing Machine, each.....$12.75
Stewart Enclosed Gear Shearing Machine, No. 8, each..$9.75
} 5% R

Clips, Axle—

Regular Styles, list July 1, '03.80%

Cloth and Netting, Wire—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c.....60&10@65%
Compression Bibbs...55&10@60%

Coffee Mills—See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list.....40%
Leather, Walter B. Stevens & Son's list.....40%

Combs, Curry—

Metal Stamping Co.....40%

Compasses, Dividers, &c.

Ordinary Goods.....70&10@75%
Wm. Schollhorn Co.:
Excelsior Dividers.....55%
Lodi Dividers.....75%

Conductor Pipe,—

L. C. L. to Dealers:

Galvanized		
Galv. Steel.	*Charcoal Iron.*	*Copper. 1½, 16&20 oz.*
Eastern:		
70%	*50&7½%*	*30%*
Central:		
65&10%	*55&2½%*	*20&10%*
Western and Southern:		
65&5%	*50&7½%*	*20&7½%*
So. Western		
50&25&2½%	*50%*	*20&5%*

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

Gal. each..	2	3	4	6	8
Labrador	$1.20	$1.50	$1.80	$2.10	$2.70
Gal.	3		4	6	8
Iceland, ea.	$1.80		$2.10	$2.40	$3.00
Gal.	2		3	4	6
Galvanized, ea.	$1.85	$2.00	$2.25	$2.90	$3.90
Galvanized, Lined, side handles, Gal.	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$1.15
White Enameled, 25%; Agate Lined, 25%					

Coopers' Tools—See *Tools, Coopers'.*

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair and heavier, 32@35¢; lighter than 3 lb. to pair.....34@37¢

Cord—Sash—

Braided, Drab.....lb. 35¢
Braided, White, Com., Nos. 8 to 12, 26¢; No. 7, 26½¢; No. 6, 27½¢.
Cable Laid Italian, lb., No. 18..37¢
Italian, lb., A, No. 18, 25¢; B, 22¢
Common India.....lb., 11@11½¢
Cotton Sash Cord, Tw'ted.18@20¢
Patent Russia.....lb...20¢
Cable Laid Russia.....lb...21¢
India Hemp, Br'd'd.....lb...21¢
India Hemp, Twisted..lb.13@14¢
Patent India, Twisted...lb...17¢
Anniston Cordage Co.: ₱ lb, solid Braided, Nos. 8 to 12, $0.24; No. 7, $0.24½; No. 6, $0.25½; ₱ doz., 50 ft., Oriole, $2.00; 50 ft., Columbia, $0.85; 50 ft., Victors, $1.00; 50 ft., 6-Thread, $1.10; 60 ft., 3-Thread, $0.95; 50 ft., Manila, $1.40; 60 ft., Jute, $0.75.
Pearl Braided, cotton, No. 6, ₱ lb, 27½¢; No. 7, 26½¢; Nos. 8 to 12, 26¢
Eddystone, Braided, Nos. 8 to 12, 26¢; 7, 26½¢; 6, 27½¢.
Harmony Cable Laid Italian, Nos. 7 to 10.....₱ lb 23 ¢
Pullman:
Wire Sash Cord.....15%
Sash Cord Attachments, per doz.10¢
Samson, Nos. 8 to 12:
Braided, ₱ lb., Drab Cotton, 55¢; Italian Hemp, 40¢@50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord.....50¢
Massachusetts, White....₱ lb 40¢
Massachusetts, Drab.....₱ lb 45¢
Phoenix, White, Nos. 8 to 12, 27¢;
} 15%
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen....57½¢
See also Chain and Ribbon.

Wire, Picture—

List July 10, 1906...85&10&10@—
Hendryx Standard Wire Picture Cord, old list, 85&10%
Turner & Stanton Co. Wire Picture Cord.....90%

Cradles—

Grain.....40&12½%

Crayons—

White Round Crayons, Cases, 100 gro., $6.50@$7.50 at factory, but lower prices made by jobbers
Zelnicker's Lumber.....₱ gro.
White and Purple, Indelible....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black.....$4.00
Giant Lumber, 5¼ in. x 15-16 in. round, all colors, $16.25; Indelibles.....$18.75
Genuine Soapstone, Metal Workers', 5 in. x ¾ in. Round, $2.50; 5 in. x ¼ in. Square, $1.75; 5 x ⅛ x 3-16, $2.50; 5 x 1¼ x 3-16.....$3.00

Crooks, Shepherds'—

Fort Madison, per doz., Heavy, $7.00; Light.....$6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden.....50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847, ₱ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor.....₱ doz. $3.00
Wm. Rogers & Son.....₱ doz. $2.50

Cutters—Glass—

H. H. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....50%
Woodward.....40%

Meat and Food—

American.....30%

Nos.	401	402	403	404	405	406	407
Each	$5	$7	$10	$12	$25	$30	$60

Enterprise:

Nos.	5	10	12	22	32
Each	$2	$3	$2.75	$4.50	$6

25@25&7½%
No. 202, $1.50.....40&7½%
Dixon's.....₱ doz. 30@30&5%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Ideal.....40@40&5%
Little Giant.....₱ doz. 40@50%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

N. E. Food Choppers.....25%
New Triumph No. 605, ₱ doz. $24.00, 40@50%
Russwin Food, No. 1, $24.00; No. 2, $27.00.....45&10&10%
Woodruff's.....₱ doz. 30@30&5%

Nos.	100	150
	$15.00	$18.00

Enterprise Beef Shavers.....25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters.....35%
Corn Graters.....30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....₱ doz. $3.00
Combined Slaw Cutter and Corn Grater.....₱ doz. $4.00
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife..₱ gr. $18@$20
Slaw Cutters, 2 Knife..₱ gr. $22@$30

Tobacco—

All Iron, Cheap..doz. $4.25@$4.50
Enterprise.....25@30%
National, ₱ doz., No. 1, $21; No. 2, $18.....40%

Diggers, Post Hole, &c.—

Disston's:
Rapid, ₱ doz., $24.00.....25%
Samson, ₱ doz., $34.00.....25%
Iwan's Imp'ved Post Hole Auger.40&5%
Vaughan Pattern Post Hole Augers, ₱ doz., $6.25
Perfection Post Hole Diggers, ₱ doz.....$8.75
Split Handle Post Hole Diggers, ₱ doz., $7.75
Kohler's, ₱ doz., Universal, $14.00; Little Giant, $12.00; Hercules, $10.00; Invincible, $9.00; Rival, $8.00; Pioneer.....$7.00
Never-Break Post Hole Diggers, ₱ doz., $24.00.....60%

Dividers—See *Compasses.*

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, ₱ doz., $18; No. 2, $15; No. 3, $12; No. 4, $18.

Drawing Knives—See *Knives, Drawing.*

Dressers, Emery Wheel—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Blacksmiths' Common Drilling Machines.....$1.50@$1.75
Breast, Millers Falls.....15&10%
Breast, P., S. & W.....40%
Goodell Automatic Drills.50&10@60&10%
Johnson's Automatic Drills, Nos. 2 and 3...16⅔%
Johnson's Drill Points.....16⅔%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's.....40%
Ratchet, Weston's.....40%
Ratchet, Weston's, Style H Improved.....40%
Ratchet, No. 012.....40%
Ratchet, Celebrated.....40%
Ratchet, Whitney's, P., S. & W...50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00.....33⅓%

Twist Drills—

Bit Stock.....60&10&10@70%
Taper and Straight Shank..... 60&10@60&10&5%

Drivers, Screw—

Screw D'ver Bits, per doz..45@50¢
Balsey's Screw Holder and Driver, ₱ doz., 2½-in., $6; 4-in., $7.50; 6-in. $9.....50%
Buck Bros.' Screw Driver Bits.....30%
Champion.....50%
Disston's.....70%
Edson.....60%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Ford's Brace Screw Drivers....40&10%
Gay's Double Action Ratchet.....35%
Goodell's Auto.....65@65&10%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40%
Millers Falls, Nos. 20 and 21.....25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
New England Specialty Co.....30%
Smith & Hemenway Co., Neverturn, 40&5%; Elmora.....50%
H. D. Smith & Co.'s Perfect H'dle.40%
Stanley R. & L. Co.'s:
No. 64, Varn, Handles, 60&10%; No. 66, 70%; Defiance, 70%; Hurwood, 55%.
Swan's:
Nos. 7565 to 7568, 50%; No. 7540, 40&10%

Eave Trough, Galvanized—

Territory.	*L. C. L. Galvanized*	
Galv. Steel.	*Charcoal Iron.*	*Copper. 1½, 16&20 oz.*
Eastern:		
70&30%	*70%*	*30%*
Central:		
75&10&2½%	*65&10%*	*20&10%*
Western and Southern:		
75&7½%	*65%*	*20&7½%*
So. Western:		
75%	*60&10%*	*20&5%*

Terms,—2% for cash. Factory shipments generally delivered.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:
Galv. Steel and Galv. C. I.
Standard Gauge.....80%
No. 26.....30%
No. 24.....25%
No. 22.....10%
Copper.....40&10%

Elbows, Stove Pipe—

Edwards, Standard Blue.....40&10&10%
Edwards, Royal Blue.....40&10&10%
Dover, one piece (R. M. Co.)....40&10%
Perfect Elbows.....40%

Emery, Turkish—

	½ to 4:	5½ to 220:	Flour.
Kegs.....lb.	*5 ¢*	*5½¢*	*3½¢*
½ Kegs.....lb.	*5½¢*	*5¾¢*	*3¾¢*
¼ Kegs.....lb.	*5½¢*	*6 ¢*	*4 ¢*
10-lb. cans, 10 in case....	*6½¢*	*7 ¢*	*6 ¢*
10-lb. cans, less than 10.....	*10 ¢*	*10 ¢*	*8 ¢*
Less quantity..	*10 ¢*	*10 ¢*	*8 ¢*

NOTE.—To lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice
—See *Squeezers, Lemon.*

Fasteners, Blind—
Zimmerman's ..... 50&10%
Waring's ..... 40&10%

Cord and Weight—
Ives 33⅓%

Faucets—
Cork Lined ..... 50@50&10%
Metallic Key, Leather Lined .. 60&10@70%
Red Cedar ..... 40&10@50%
Petroleum ..... 70&10@75%
B. & L. B. Co.:
Metal Key ..... 60&10%
Star 60%
West Lock ..... 50&10%
John Sommer's Peerless Tin Key 40%
John Sommer's Boss Tin Key 50%
John Sommer's Victor Mtl. Key ..... 50&10%
John Sommer's Duplex Metal Key 60%
John Sommer's Diamond Lock 40%
John Sommer's I. X. L. Cork Lined 50%
John Sommer's Reliable Cork Lined .. 50&10%
John Sommer's Chicago Cork Lined 60%
John Sommer's O. K. Cork Lined 50%
John Sommer's No Brand, Cedar 50%
John Sommer's Perfection, Cedar 40%
McKenna, Brass:
Burglar Proof, N. P. 25%
Improved, ⅜ and ½ inch 25%
Self Measuring:
Enterprise, ℔ doz. $36.00 ..... 40&10%
Lane's, ℔ doz. $36.00 ..... 40&10%
National Measuring, ℔ doz. $36.40&10%

Felloe Plates—
See *Plates, Felloe.*

Files— Domestic—
List Nov. 1, 1899.
Best Brands ..... 70&10@75&10%
Standard Brands .. 75&10@75&10&10%
Lower Grade .... 75&10&10@80&10&10%

Imported—
Stubs' Tapers, Stubs' list, July 24, '97 ..... 33 1-3@40%

Fixtures, Fire Door—
Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 ..... $3.75
Fusible Links, No. 96 ..... 50%
Expansion Bolts, No. 107 ..... 60&10%

Grindstone—
Net Prices:

Inch	15	17	19	21
Per doz.	$3.25	3.75	4.25	4.75

P., S. & W. Co. ..... 30&10%
Reading Hardware Co. 60%
Stowell's Giant Grindstone Hanger, ℔ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy, 40&10%; Light 50%

Fodder Squeezers—
See *Compressors.*

Forks—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Iowa Dig-Ezy Potato ..... 60&10%
Victor, Hay ..... 60&15&2½%
Victor, Manure 66⅔%
Victor, Header 65%
Champion, Hay 66⅔%
Champion, Header 65%
Champion, Manure ..... 60&15&2½%
Columbia, Hay ..... 60&20%
Columbia, Manure 70%
Columbia, Spading ..... 70&12½%
Hawkeye Wood Barley 40%
W. & C. Potato Digger ..... 60&10%
Acme Hay ..... 60&20%
Acme Manure, 4 tine ..... 60&10&5%
Dakota Header ..... 60&20%
Jackson Steel Barley ..... 60&20%
Kansas Header 65%
W. & C. Favorite Wood Barley 40%
Plated.—See Spoons.

Frames— Saw—
White, S'g't Bar, per doz. .75@80¢
Red, S'g't Bar, per doz. .. $1.00@1.25
Red, Dbl. Brace, per doz. $1.40@1.50

Freezers, Ice Cream—

Qt.	1	2	3	4	6
Each	$1.30	$1.60	$1.90	$2.20	$2.80

Fruit and Jelly Presses—
See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*
Hemp $2.75
Cotton 3.20
Waterproof Sgl. Taped .. 3.65
Waterproof Dbl. Taped .. 4.40
Waterproof Tpl. Taped .. 5.15
10&2½%

Gates, Molasses and Oil—
Stebbins' Pattern ..... 80&10%

Gauges—
Marking, Mortise, &c. .50@50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c. ..... 50&50&10%
Disston's Marking, Mortise, &c. .. 67½%
Stanley R. & L. Co.'s Butt and Rabbet Gauge 35%
Marking and Mortise 65%
Wire, Brown & Sharpe's 33⅓%
Wire, Morse's 25%
Wire, P. S. & W. Co. 30%

Gimlets— Single Cut—
Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.20
Spike, Metal, No. 1, $4.00; 2, $4.40
Nail, Wood Handled, No. 1, $2.80; 2, $2.60
Spike, Wood Handled, No. 1, $4.80; 2, $4.60

Glass, American Window
See *Trade Report.*

Glasses, Level—
Chapin-Stephens Co. ..... 65@65&10%

Glue, Liquid Fish—
Bottles or Cans, with Brush .. 25&10@50%
International Glue Co. (Martin's) .. 40%

Grease, Axle—
Common Grade .... *gro.* $4.50@6.00
Dixon's Everlasting, 10-lb pails, ea. 85¢; in boxes, ℔ doz., 1 lb, $1.20; 2 lb $2.00
Helmet Hard Oil 25%

Griddles, Soapstone—
Pike Mfg. Co. ..... 33⅓@33⅓&10%

Grindstones—
Pike Mfg. Co.:
Improved Family Grindstones, ℔ inch, ℔ doz., $2.00 ..... 33⅓%
Royal Mfg. Co.:
Alundum Grinding Machines, each, Nos. 01, $1.75; 1A, $2.50; 10, $5.00 ..... 30%
Alundum Sickle Grinders, each, Nos. 20A, $6.00; 20A Combined, $6.50 ..... 30%
Alundum Disc Grinders, each, $2.50 ..... 30%

Grips, Nipple—
Perfect Nipple Grips ..... 40&10&2%

Halters and Ties—
Cow Ties ..... 60&5@60&10%
Covert Mfg. Co.:
Web ..... 30&2%
Jute Rope 35%
Sisal Rope 20%
Cotton Rope 45%
Hemp Rope 45%
Oneida Community:
Am. Coil and Halters ..... 40@40&5%
Am. Cow Ties ..... 45@50%
Niagara Coil and Halters .. 45@50&5%
Niagara Cow Ties .... 45&5@50&10&5%

Hammers—

Handled Hammers—
Heller's Machinists' ... 55&10@55&10&5%
Heller's Farriers' ..... 40&5@40&10&5%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75 ..... 50%
Peck, Stow & Wilcox, Steel 50%
Fayette R. Plumb:
A, E. Nail ..... 40&2½@40&12½%
Eng. and B. S. Hand .... 50&12½@60%
Machinists' Hammers .... 50&15@60&5%
Rivet and Tinners' ... 40&2½@40&12½%
Vaughan & Bushnell Mfg. Co.:
A. E. Nail ..... 40&2½@40&12½%
Machinists' ..... 50&15@60&5%

Heavy Hammers and Sledges—
Under 3 lb., per lb., 50¢ .80&5@ .. %
3 to 5 lb., per lb., 40¢ .80&5@ .. %
Over 5 lb., per lb., 30¢ ..... 80&10&5@ .. %
Wilkinson's Smiths' ... lb. 9½@10¢

Handles—

Agricultural Tool Handles
Axe, Pick, &c. .... 60&10@60&10&5%
Hoe, Rake, &c. ..... 40@45&5%
Fork, Shovel, Spade, &c.:
Long Handles ..... 40@45&5%
D Handles 40%

Cross-Cut Saw Handles—
Atkins 40%
Champion 50%
Disston's 50%

Mechanics' Tool Handles—
Auger, assorted ... *gro.* $2.50@$3.00
Brad Awl ..... *gro.* $1.65@$1.75
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, $2.40@$2.65; *Hickory* ..... $2.15@2.40
Socket Firming, Apple, $1.75@$1.95; *Hickory* .... $1.45@$1.60
Socket Framing, Hickory, $1.60@$1.75
File, assorted ..... gro. $1.30@$1.40
Hammer, Hatchet, &c. 60&10@60&10&5%
Hand Saw, Varnished, doz. 80&85¢; *Not Varnished* ... 65@75¢
Plane Handles:
Jack, doz. 30¢; *Jack, Bolted* .75¢
Fore, doz. 45¢; *Fore, Bolted* .90¢
Chapin-Stephens Co.:
Carving Tool ..... 40@40&10%
Chisel ..... 65@65&10%
File and Awl ..... 65@65&10%
Saw and Plane ..... 40@40&10%
Screw Driver ..... 40@40&10%
Millers Falls Adj. and Ratchet Auger Handles ..... 20&10%
Nicholson Simplicity File Handle ..... ℔ gro. $0.85@$1.50
W. A. Zelnicker Supply Co.:
Hammer, per doz., 12 in., $2.00; 14 in., $2.00; 16 in., $2.30; 18 in., $2.50; 20 in., $2.70; 22 in., $3.00; 24 in., $3.30; 26 in., $3.50; 30 in., $3.80.
Sledge, per doz., oval 30 in., $3.80; octagon, 30 in., $3.80; oval, 36 in., $4.00; octagon, 36 in., $4.00.
Axe, per doz., 28 to 34 in., $5.60; 36 in., $5.80.
Adze, per doz., 36 in., $5.80; 36 in., $7.80.
Pick, per doz., R. R., 36 in., $8.00; coal, 34 in., $5.80.
Hatchet, per doz., 12 to 14 in., $2.00.

Hangers—
NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.
Allith Mfg. Co.:
Reliable, No. 1; Allith, No. 3; Allith Adjustable, No. 6; Reliable Parlor Door 50%
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin 25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door 50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle ..... 60&10%
Roller Bearing 70%
Griffin Mfg. Co.:
Solid Axle, No. 19, $12.00 ..... 70%
Roller Bearing, No. 11, $15.00 .. 70%
Roller Bearing, Ex. Hy., No. 22, $18.00 ..... 70%
Hinged Hangers, $16.00 .... 60&10%
Lane Bros. Co.:
Parlor, Ball Bearing, $4.00; Standard, $3.15; No. 105, $2.85; New Model, $2.80; New Champion $2.25
Barn Door, Standard ..... 60&5%
Hinged ..... net $6.08
Covered ..... 60&2%
Special ..... 70&5%
Lawrence Bros.:
Advance and Sterling .... 60&2½%
Cleveland and Peerless .. 70&7½%
Clipper, No. 75 ..... 60&5%
Crown ..... 60&2½%
Cyclone-Tandem ..... net $7.50
Easy Parlor Door, Dbl. Sets, $2.50; Single Sets, $1.25.
Giant 60%
Hummer ..... 70&7½%
New Cyclone, Flexible, $16.00 60%
New York ..... 60&2½%
McKinney Mfg. Co.:
No. 1, Special, $15 ..... 60&10%
No. 2, Standard, $18 ..... 60&10%
Hinged Hanger, $16 ..... 50%
Meyers' Stayon Hangers 60%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, ... 60&5%
Pioneer Wood Track, No. 3 .. $2.25
Roller B'r'g St'l Track No. 12 .. $2.20
Roller B'r'g St'l Track No. 13 .. $2.50
Roller B'r'g, Nos. 39, 41, 43, ... 70&7½%
Hero, Adj. Track No. 19 .. 50&10%
Adjustable Track Tandem Trolley Track No. 16 ..... 50&10%
Seal, Steel Track No. 8 ..... $2.25
Auto Adj. Track No. 22.—50&5%
Trolley B. D. No. 17, $1.25; F. D. No. 120, $2.25; No. 121, $2.45; No. 150 ..... $2.50
Safety Underwriters F. D. No. 101 ..... 50%
Tandem No. 41..2½ and 3 .. 60&10%
P lace, Adjustable Track No. 132 ..... 50&5%
Royal, Adjustable Track No. 122 ..... 50&10%
Ives' Wood Track No. 1 ..... $2.25
Trolley B. D. No. 23 ..... 50&10%
Trolley B. D. No. 24, $1.30; No. 27, $1.40; No. 28 ..... $1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2 .. 70&7½%
Anti-friction, No. 42; No. 44, sizes 2½ and 3 ..... 60%
Hinged Tandem No. 48 .... 60&5%
Folding Door B. B. Swivel No. 135 ..... 40%
Stowell Mfg. & Foundry Co.:
Acme Parlor Ball Bearing 30%
Ajax Hinge Door 60%
Apex Parlor Door ..... 50&10&5%
Atlas 60%
Baggage Car Door 50%
Climax Anti-Friction 50%
Elevator 40%
Express 50%
Lundy Parlor Door 50%
Matchless 60%
Nansen 70%
Parlor Door, 50&10%; Railroad, ... 50&10%
Steel, Nos. 300, 404, 500 ..... 50%
Underwriters' Fire Door 40%
Wild West Warehouse Door .. 50%
Wilbern, No. 0, net, ℔ doz. $9.00
Zenith for Wood Track 50%
A. L. Sweet Iron Works:
Check Back, 70%; Eagle 70%
Climax Anti-Friction ..... 50&10%
Hylo Hinge, New Perfection, Pilot, Pilot Hinge 60%
Rider Wooster 65%
Western Pattern 70%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing .. 50&15&10&5%

Hangers— Garment—
Pullman Trouser, ℔ gro., 1 pair Flat Aluminoy, $9.00; 1 pair Round Nickeled, $9.00; 4 pair Round Nickeled, $27.00; 1 pair Flat Gun Metal, $12.00; 1 pair Flat Black Enameled, $7.50; 1 pair Wood Clamp, $13.50; Skirt Hangers, Folding, per gro., $21.00; Coat Hangers, Folding, per gro., $8.00; Garment Hanger Rods, Round Nickeled, per gro., $10.50; Garment Hanger Loops, Round Nickeled, per gro. $10.50
Victor Folding ..... ℔ gro. $9.60
Western, W. G. Co. ..... 75&10%

Gate—
Myers' Patent Gate Hangers, ℔ doz. net $4.50

Joist and Timber—
Lane Bros. Co. 30%

Hasps—
Griffin's Security Hasp ..... 50&10%
McKinney's Perfect Hasp, ℔ doz. .. 50%

Hatchets—
Regular list, first qual. 40&7½%—
Second quality ..... 50&10%—

Heaters, Carriage—
Clark, No. 5, $1.75; No. 5B, $2.00; No. 3, $2.25; No. 3D, $2.75; No. 7D, $3.00; No. 3E, $3.25; No. 1, $3.50 ..... 25%
Clark Coal, ℔ doz., $0.75 ..... 20%

Hinges—

Blind and Shutter Hinges—
Surface Gravity Locking Blind:
(Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	1	3	5
Doz. pair	$0.75	1.35	2.70

Mortise Shutter:
(L. & P., O. S., Dixie, &c.)

No.	1	1½	2	2½
Doz. pair	$0.70	.65	.60	.55

Mortise Reversible Shutter (Buffalo, &c.):

No.	1	1½	2
Doz. pair	$0.70	.65	.60

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50 ..... 10%
Charles Parker Co. ..... 70@75%
Parker Wire Goods Co.:
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00 ..... 20%
Reading's Gravity 60%
Stanley's Steel Gravity Blind Hinges, No. 1647½, ℔ doz. sets, without screws, $0.95; with screws, $1.25.
Wrightsville Hardware Co.:
O. S., Lull & Porter ..... 70&10&2½%
Acme, Lull & Porter ..... 70&5&2½%
Queen City Reversible ..... 70&5&2½%
Shepard's Noiseless, Nos. 60, 65, 55 ..... 70&10&2½%
Niagara, Gravity Locking, Nos. 1, 3 & 5 ..... 10&10&2½%
1868, Old Pat'n, No. 1 ..... 75%
Nos. 3 & 5 ..... 70&10&2½%
Tip Pat'n, No. 1 ..... 75%
No. 3 ..... 70&10&2½%
Buffalo Gravity Locking, Nos. 1, 3 & 5 ..... 70&5%
Shepard's Double Locking .. 70&5&2½%
Champion Gravity Locking .. 70&10&2½%
Pioneer 75%
Empire 60%
W. H. Co.'s Mortise Gravity Locking, No. 2 ..... 60%

Gate Hinges—

Clark's or Shepard's—Doz. sets:			
No.	1	2	3
Hinges with L't'chs.	$2.00	2.70	5.00
Hinges only	1.40	2.05	3.80
Latches only	.70	.70	.35

New England:
With Latch ..... doz. ..... @$2.00
Without Latch ..... doz. ..... @$1.60
Reversible Self-Closing:
With Latch ..... doz. ..... @$1.75
Without Latch ..... doz. ..... @$1.35
Western:
With Latch ..... doz. $1.75
Without Latch ..... doz. $1.15
Wrightsville Hardware Co.:
Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, Nos. 1, 2 or 3 ..... 65&5%

Pivot Hinges
Bommer Bros. Pivot 40%
Lawson Mfg. Co. Matchless 50%

Spring Hinges—
Holdback, Cast Iron ... $6.50@$7.00
Non-Holdback, Cast Iron $6.25@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges 40%
Bardsley's Patent Checking .. 33⅓%
Bommer Bros.:
Bommer Ball Bearing Floor .. 40%
Bommer Spring Hinges 40%
No. 999 Wrot. Steel Hold Back, ℔ gr. $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges 25%
Triple End Spring Hinges 50%
Chicago (Ball Bearing) Floor .. 50%
Garden City Engine House 25%
Keene's Saloon Door 25%
Columbian Hardware Co.:
Acme, Wrought Steel 30%
Acme, Brass 25%
American 30%
Columbia, ℔ gr., No. 14, $9.00; No. 18, $25.00
Columbia, Adj., No. 7, ℔ gr. $12.00
Columbian Hinges ..... 60&10%
Gem, new list 30%
Clover Leaf ..... ℔ gr. $12.00
Oxford, new list 30%
Floor Spring Hinges ..... 65&10%
Lawson Mfg. Co., Matchless 30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door ..... ℔ gr. $9.00
Chief Ball Bearing Floor Hinge 50%
Ball Bearing Door 25%
No. 777, Sheet Steel Holdb'k, ℔ gr. pr. $9.00
Superior Spring Hinge Co.:
Superior Floor Hinges 33⅓%
The Stover Mfg. Co.:
Ideal, No. 16, Detachable, ℔ gr. $12.50
Ideal, No. 4 ..... ℔ gr. $9.00
New Idea No. 1 ..... ℔ gr. $9.00
New Idea, Double Acting 50%
New Idea Floor 50%

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—
Strap and T Hinges, &c., list December 20, 1904:
Light Strap Hinges 60%
Heavy Strap Hinges 65%
Light T Hinges 55%
Heavy T Hinges 45%
Extra Heavy T Hinges .. 60%
Hinge Hasps 40%
Cor. Heavy Strap 65%
Cor. Ex. Heavy T 60%
Screw Hook and Strap. { 6 to 12 in. .lb. 3¾¢ ; 1½ to 20 in. .lb. 3¼¢ ; 22 to 36 in. .lb. 3½¢ }
Extra 10&10%

Screw Hook and Eye:
⅝ to 1 inch ..... lb. 6¼¢
⅝-inch ..... lb. 7¼¢
½-inch ..... lb. 8½¢

Extra 60&10% often given.

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers..30&2%

Hods— Coal—
M'f'gr's list, price per gross.

Inch	15	16	17	18	
Galv. Open	$35	$39	$42	$46	10&5%
Jap. Open	26	28	31	35	
Galv. Funnel	43	48	52	56	
Jap. Funnel	33	36	39	43	

Masons' Etc.—
Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $1.05
Steel Mortar, No. 158.....each $1.35

Hoes— Eye—
Scovil and Oval Pattern.....
60&10@60&10&10%
Grub, list Feb. 23, 1899.....
70&10@75&10%
D. & H. Scovil.....30%

Handled—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Cronk's Weeding, No. 1, $2.75; No. 2, $2.50
Star Double Bit.....$3.20
Ft. Madison Cotton Hoe....10&10&10%
Ft. Madison Crescent Cultivator Hoe, ₱ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....₱ doz. 66⅔%
Junior Size.....₱ doz. $4.00
Ft. Madison Sprouting Hoe..₱ doz. 50%
Ft. Madison Dixie Tobacco Hoe.....
75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.15
B. B., 6½ in.....$3.35
Acme Wedding.....₱ doz., net, $4.35
W. & C. L'tning Shuffle Hoe..₱doz.$4.85

Hoisting Apparatus—
See *Machines, Hoisting.*

Holders— Bit—
Angular, ₱ doz. $24.00.....45&10%

Door—
Bardsley's, Iron, 40%; Brass and Bronze.....33⅓%
Empire.....50%
Pullman.....35%
Superior.....33⅓%

File and Tool—
Nicholson File Holders and File Handles.....33⅓@40%

Fruit Jar—
Triumph Fruit Jar Holder, ₱ gross, $10.80; ₱ doz.....$1.25

Trace and Rein—
Fernald Double Trace Holder, ₱ doz. pairs.....$1.25
Dash Rein Holder, ₱ doz. pairs..$1.25

Hones—Razor—
Pike Mfg. Co., Belgian, German and Swaty.....50%

Hooks—Cast Iron—
Bird Cage, Reading.....40%
Clothes Line, Reading List.....40%
Clothes Line, Stowell's.....70%
Coat and Hat, Reading.....45&20%
Coat and Hat, Stowell's.....70%
Coat and Hat, Wrightsville.....65%
Harness, Reading List.....40%
Harness, Stowell's.....60%
School House, Stowell's.....70%

Wire—
Belt.....80%
Wire C. & H. Hooks:.....
75@75&10%
Columbian Hdw. Co., Gem.....70&5%
Parker Wire Goods Co., King..70&10%
Western W. G. Co. Molding.....75%
Wire Goods Co.:
Acme, 60&10%; Chief, 70%; Crown, 75%; Czar, 65%; V Brace, 75%; Czar Harness, 50&10%.

Wrought Iron—
Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton.....*doz. $1.05@$1.25*
Wrought Staples, Hooks, &c.—
See Wrought Goods.

Miscellaneous—
Hooks, Bench, see *Stops, Bench.*
Bush, Light, doz. $4.75; Medium, $5.35; Heavy, $6.25
Grass, best, all sizes, per doz.$1.60
Grass, common grades, all sizes, per doz.....*$1.30*
Whiffletree.....*lb. 5¾@6¢*
Hooks and Eyes:
Brass.....*60&5@60&10&5%*
Malleable Iron.....*70@70&10%*
Covert Mfg. Co. Gate and Scuttle Hooks.....40%
Ft. Madison Cut-Easy Corn Hooks, ₱ doz. $3.25 net.
Turner & Stanton Co. Cup and Shoulder.....80&10&10%
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—
See *Nails, Horse.*

Horseshoes—
See *Shoes, Horses.*

Hose, Rubber—
Garden Hose, ¾-inch:
Competition.....*ft. 5 @ 6 ¢*
3-ply Guaranteed..*ft. 8 @ 9 ¢*
4-ply Guaranteed..*ft. 10 @11 ¢*
Cotton Garden, ¾-in., coupled:
Low Grade.....*ft. 8 @ 9 ¢*
Fair Quality.....*ft. 10 @11 ¢*

Irons— Sad—
From ½ to 10.....*lb. 3 @3½¢*
B. B. Sad Irons.....*lb. 3¼@3½¢*
Mrs. Potts', cents per set:

Nos.	50	55	60	65
Jap'd Tops	80	77	90	88
Tin'd Tops	85	88	95	98

New England Pressing..*lb. 3¾@4¢*

Pinking—
Pinking Irons.....*doz. 80¢*

Irons, Soldering
See *Coppers.*

Jacks, Wagon—
Covert Mfg. Co.:
Auto Screw.....30&2%; Steel, 45%
Lockport.....50%
Lane's Steel.....30&10&2%
Richards' Tiger Steel, No. 130...50&10%
Smith & Hemenway Co.'s.....25%

Kettles—
Brass, Spun, Plain.....*20@25%*
Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—
Foster Bros.' Butcher, &c.....30%
Wilkinson Shear & Cutlery Co.....60%

Corn—
Wilkinson Shear & Cutlery Co., Wilcut Brand Knives and Hooks..60%
Withington Acme, ₱ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—
Standard List.....*75&5@75&10%*
C. E. Jennings & Co., Nos. 45, 46..60%
Jennings & Griffin, Nos. 41, 42.....75%
Swan's.....66⅔@70%
Watrous.....16⅔%
L. & I. J. White.....20&5@25%

Hay and Straw—
Serrated Edge, per doz..$5.50@5.75
Iwan's Sickle Edge.....₱ doz. $9.50
Iwan's Serrated.....₱ doz. $10.00

Mincing—
Buffalo.....₱ gro. $13.00

Miscellaneous—
Farriers'.....*doz. $3.00@3.25*
Wostenholm's.....₱ doz. $3.00@3.25

Knobs—
Base, 2½-inch, Birch, or Maple, Rubber Tip.....*gro.$1.25@$1.40*
Carriage, Jap., all sizes.....
gro. 40@45¢
Door, Mineral.....*doz. 65@70¢*
Door, Por. Jap'd.....*doz. 70@75¢*
Door, Por. Nickel..*doz. $2.05@2.15*
Bardsley's Wood Door, Shutters, &c.15%

Lacing, Leather—
See *Belting, Leather—*

Ladders, Store, &c.—
Allith Mfg. Co., Reliable.....50%
Lane's Store.....25%
Myers' Noiseless Store Ladders....45%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Melting—
L. & G. Mfg. Co. (low list).....25%
P. S. & W.....40&10%
Reading.....50%

Lanterns—Tubular—
Regular Tubular, No. 0.....
doz.$4.25@4.50
Lift Tubular, No. 0.....
doz.$4.75@5.00
Hinge Tubular, No. 0.....
doz.$4.75@5.00
Other Styles.....*40@40&5%*

Bull's Eye Police—
No. 1, 2¾-inch.....*$2.75@3.00*
No. 2, 3-inch.....*$3.00@3.25*

Lasts and Stands, Shoe—
Stowell's Atlas, Malleable Iron.....50%
Stowell's Badger, Cast Iron.....50%

Latches— Thumb—
Roggin's Latches, with screw..
doz. 35@40¢

Door—
Allith Mfg. Co., Automatic, No. 400, ₱ doz.....$4.00
Cronk & Carrier Mfg. Co., No. 101, ₱ doz. $2.30
Cronk & Carrier Mfg. Co., Latch, Hasp and Staples.....50%
Richards' Bull Dog, Heavy, No. 125.....50&5%
Richards' Trump, No. 127.....$1.50
Stowell's Steel.....50%

Leaders, Cattle—
Small.....*doz. 50¢; large, 60¢*
Covert Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%; Sisal, 20%.

Lifters, Transom—
R. & E.....10%

Lines—
Wire Clothes, Nos. 18 19 20
100 feet.....*$2.25 2.00 1.75*
75 feet.....*$1.75 1.55 1.10*
Anniston Waterproof Clothes, 50 ft. ₱ gro., $25.00; Gilt Edge, $23.00; Air Line, $23.00; Acme, $18.00; Alabama, $17.00; Empire, $16.00; Advance, $14.00; Eclipse, $13.50; Chicago, $11.50; Standard, $10.50; Columbia, $9.50; Allston, $13.50; Calhoun, $12.00.
Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Solid Braided Masons'.....30%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....₱ gr. 20%
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....20%
Turner & Stanton Co.:
Solid Braided Chalk, Masons' and Awning Lines.....40%
Clothes Lines White Cotton.....20%
Shade Cord, Cotton or Linen....20%

Locks— Cabinet—
Cabinet Locks.....*23⅓%*

Door Locks, Latches, &c.—
NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....40%
R. & E. Mfg. Co.....10%

Elevator—
Stowell's.....50%

Padlocks—
R. & E. Mfg. Co. Wrought Steel and Brass.....75&10%

Sash, &c.—
Ives' Patent:
Bronze and Brass, 60%; Crescent, 40&20%; Iron, 60%; Window Ventilating, 55%; Robinson Pat. Ventilating Sash Lock, 33⅓%; Wrought Bronze and Brass, 55%; Wrought Steel, 55%.
Pullman Patent Ventilating Lock..35%
Reading.....40%

Machines—Boring—
Com. Upr't, without Augers.....
$2.00@2.25
Com. Angl'r, without Augers.....
$2.25@2.50
Swan's Improved.....40&10%
Jennings', Nos. 1 and 4.....33⅓%
Millers' Falls.....5.75
Snell's, Upright, $2.65; Angular, $2.90

Corking—
Reisinger Invincible Hand Power.....
₱ doz. $48.00

Fence—
Williams' Fence Machines....each, $5.50

Hoisting—
Moore's Anti-Friction Chain Hoist.30%
Moore's Hand Hoist, with Lock Brake.....20%
Moore's Cyclone High Speed Chain Hoist.....25%

Ice Cutting—
Chandler's.....12½%

Washing
Boss Washing Machine Co.: Per doz.
Boss No. 1.....$57.00
Boss Rotary.....$57.00
Champion Rotary Banner No. 1.$57.00
Standard Champion No. 1.....$50.00
Standard Perfection.....$27.00
Cincinnati Square Western.....$33.00
Uneeda American, Round.....$33.60

Mallets—
Hickory.....*45&5@50%*
Lignumvitæ.....*45&5@50%*
Tinners' Hickory and Applewood.....*doz. 45&5@50%*

Mangers, Stable—
Swett Iron Works.....50%

Mashers, Vegetable—
Western, W. G. Co., Potato....60&10%

Mats, Door—
Elastic Steel (W. G. Co.), new list.50%
Keystone Wire Matting Co.:
Keystone.....50%
Ideal.....50%

Mattocks—
See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—
Enterprise Mfg. Co.....20@25%
National list Jan. 1, 1902.....30%
Parker's Columbia & Victoria.50&10@60%
Parker's Box and Side.....50&10@60%
Swift, Lane Bros. Co.....30%

Motors Water—
Divine's Red Devil.....30%

Mowers, Lawn—
NOTE.—Net prices are generally quoted
Cheapest.....*all sizes, $1.85@2.00*
Cheap.....*all sizes, $2.00@2.50*
Better Grade..*all sizes, $2.50@4.50*

	12	*14*	*16*	*18-in.*
High Grade	*$4.50*	*4.75*	*5.00*	*5.25*
Continental				60%
Great American				70%
Great American Ball B'r'g, new list				70%
Quaker City				70%
Pennsylvania				60%
Pennsylvania, Jr., Ball Bearing				50&10&5%
Pennsylvania Golf				50%
Pennsylvania Horse				33⅓&5%
Pennsylvania Pony				40&5%

Granite State:
Style A, Low Wheel.....70&10&10%
Style B, Low Wheel.....70&10%
Style C, High Wheel, spcl. disct.,.....70&10%
Style D, High Wheel, spcl. disct.70%
Philadelphia:
Styles M., S., O., K., T....70&10&5%
Style A, all Steel.....60&10&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.40%
Horse.....40&5%
Pony.....40&5%
36-in, Horse.....30&10%
Eagle Horse.....30&5%
I. X. L. Horse.....50%

Nails—
Wire Nails and Brads, Miscellaneous.....*87½@87½&10%*
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers' &c. See *Tacks.*

Horse—

Nos.	6	7	8	9	10	
Anchor	23	21	20	19	18	...40&5%
Champlain	28	26	25	24	23	.....50%
Coleman	13	12	12	11	11	.....net
New Haven	23	21	20	19	18	...40&5%
Livingston	19	18	17	16	16	.....10%

Western.....₱ lb 8½¢
Jobbers' Special Brands.....
per lb.9@10¢

Picture—

	1½	*2*	*2½*	*3*	*in.*
Brass H'd	*.55*	*.55*	*.60*	*.70*	*.. gro*
Por. Head	*.. 1.10*	*1.10*	*1.10*		*.. gro*

Nippers—
See *Pliers and Nippers.*

Nuts—
Cold Punched: *Off list*
Square, Blank or Tapped..4.80¢
Hexagon, Blank or Tapped..5.10¢
Square, Bk. C., T. & R...5.10¢
Hexagon, Bk. C., T. & R.5.70¢
Hot Pressed:
Square, Blank.....*5.00¢*
Hexagon, Blank.....*5.40¢*
Square, Tapped.....*4.70¢*
Hexagon, Tapped.....*5.10¢*

Oakum—
Best.....*lb., 6½¢*
U. S. Navy.....*lb., 6¢*
Navy.....*lb., 5¢*
Plumbers' Spun Oakum.....*8¾¢*
In carload lots ½¢ lb. off, f.o.b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—
Brass and Copper.....*50&10%*
Tin or Steel.....*65&10&5@70%*
Zinc.....*65&10&5@70%*
Chase or Paragon:
Brass and Copper.....*50&10%*
Tin or Steel.....*65&10%*
Zinc.....*65&10%*
Malleable, Hammers' Improved, Nos. 11, 12 and 13, 20%; Old Pattern, Nos. 1, 2, 3, 50%.
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

Openers— Can— *Per doz.*
Sprague, Iron Handle....*30@35¢*
Sprague, Wood Handle...*35@40¢*
Sardine Scissors.....*$1.75@$3.00*
Vim Tin Shear and Can Opener, ₱ doz., 75c.; per gro., $7.50
Yankee Can and Bottle Opener, ₱ doz., net.....$0.75

Egg—
Nickel Plate, ₱ doz., $2.00; Silver Plate, $4.00.

Packing—
Asbestos Packing, Wick and Rope.....*20@25¢*

Rubber—
(Fair quality goods.)
Sheet, C. I......*11@12¢*
Sheet, C. O. S......*11@12¢*
Sheet, C. B. S......*12@13¢*
Sheet, Pure Gum.....*40@45¢*
Sheet, Red.....*40@50¢*
Jenkins' '96, ₱ lb. 80¢.....25%

Miscellaneous—
American Packing...*lb. 7@10 ¢*
Cotton Packing.....*lb. 16@25 ¢*
Italian Packing.....*lb. 9@12½¢*
Jute.....*lb. 4@ 4½¢*
Russia Packing.....*lb. 8@11 ¢*

Pails, Creamery—
R. M. Co., with gauges, ₱ doz., No. 1, $6.25; No. 2, $6.50.

Pails, Water, Well, &c.—
See *Buckets.*

Pans— Dripping—
Standard List.....*70&10@75%*
Edwards, Royal Blue.....65&7½%

Fry—
Common Lipped:

Nos.	*1*	*2*	*3*	*4*	*5*
Per doz	*$0.75*	*0.80*	*0.90*	*1.10*	*1.30*

Refrigerator, Galva.—

Inch	*12*	*14*	*16*	*18*
Per doz	*$1.75*	*2.25*	*2.80*	*3.15*

Roasting and Baking—
Regal, R. M. Co., ₱ doz., Nos. 5, $4.50; 10, $5.25; 20, $5.75; 30, $6.25.
Savory, ₱ doz., net, Nos. 200, $9.00; 400, $15.00.
Simplex, ₱ gro.:

No.	40	50	60	140	150	160
	$30.00	35.00	42.00	34.00	39.00	46.00

Paper—Building Paper
Asbestos: *lb.*
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft.3½to5¢
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lb., per 100 sq. ft.....*6¢*
Mill Board, Sheet, 40 x 40 in., 1-32 to ½ in.....*3@5¢*
Per roll
Rosin Sized Sheathing: 500 sq. ft.
Light weight, 25 lbs. to roll.....
40@50¢
Medium weight, 30 lbs. to roll.....
50@55¢
Heavy weight, 40 lbs. to roll.....
65@70¢
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton.....*$50.00*
Red Rope Roofing, 250 sq. ft. per roll.....*$1.75*

Tarred Paper—
1 ply (roll 400 sq. ft.), ton.....
$31.00@$35.00
2 ply, roll 108 sq. ft.....*57¢*
3 ply, roll 108 sq. ft.....*80¢*
Slater's Felt (roll 500 sq. ft.).76¢

Sand and Emery—
Flint Paper and Cloth.50&10@—%
Garnet Paper and Cloth....*25%*
Emery Paper and Cl'h..50&10@60%

Parers— Apple—
Advance.....₱ doz. $4.00
Baldwin.....₱ doz. $4.00
Bonanza Improved.....each $6.50
Daisy.....₱ doz. $4.00
Dandy.....each $7.50
Eureka Improved.....each $20.00
Family Bay State.....₱ doz. $15.00
Improved Bay State.....₱ doz. $36.00
Little Star.....₱ doz. $5.00
New Lightning.....₱ doz. $7.00
Reading 72.....₱ doz. $3.25
Reading 78.....₱ doz. $6.25
Rocking Table.....₱ doz. $8.20
Turn Table '98.....₱ doz. $8.00
White Mountain.....₱ doz. $5.00

Potato—
Saratoga.....₱ doz. $7.00
White Mountain.....₱ doz. $8.00

Picks and Mattocks—
List, Feb. 23, 1899..70&5@70&10%
Cronk's Handled Garden Mattock, ℔ doz., No. 2, $2.60; No. 3, $6.40.

Pinking Irons—
See *Irons, Pinking.*

Pincers—
Vaughan & Bushnell Mfg. Co.:
Blacksmiths', per doz., 10 in., $5.00; 12 in., $5.50; 14 in., $6.00.
Carpenters' Claw, per doz., 6 in., $2.00; 8 in., $2.75; 10 in., $3.50.

Pins, Escutcheon—
Brass .....50@50&10%
Iron, list Nov. 11, '85..60@60&10%

Pipe, Cast Iron Soil—
Carload lots.
*Standard, 2-6 in.*50&10@50&10&5%
Extra Heavy, 2-6 in......65&10%
Fittings .....70&10@70&10&5%

Pipe, Merchant—
Consumers, Carloads.

	Steel.		*Iron.*	
	Blk.	*Galv.*	*Blk.*	*Galv.*
	%	%	%	%
¼ & ⅜ in...	64	48	57	41
½ in.....	66	52	59	41
½ in.....	68	56	61	49
¾ to 6 in....	72	62	66	56
7 to 12 in....	69	54	61	46

Pipe, Vitrified Sewer—
Carload lots.
Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:
First-class 84%
Second-class 87%
NOTE.—Market irregular.

Pipe, Stove—

	Per 100 joints.	
Edwards' Nested:	C. L.	L. C. L.
5 in., Standard Blue....	$6.25	$7.25
6 in., Standard Blue....	6.75	7.75
7 in., Standard Blue....	7.75	8.75
5 in., Royal Blue.....	7.00	8.00
6 in., Royal Blue.....	7.50	8.50
7 in., Royal Blue.....	8.50	9.50
Wheeling Corrugating Co.'s Nested:		
5 in., Uniform Color..	$6.15	$7.15
6 in., Uniform Color..	6.65	7.65
7 in., Uniform Color..	7.65	8.65

Planes and Plane Irons—
Wood Planes—
Bench, first qual.....30@30&10%
Bench, second qual...40@40&10%
Molding .....25@25&10%
Bailey's (Stanley R. & L. Co.)..35&2½%
Chapin-Stephens Co.:
Bench, First Quality.....30%
Bench, Second Quality.....40%
Molding and Miscellaneous.....25%
Toy and German.....30%
Union 60%

Iron Planes—
Bailey's (Stanley R. & L. Co.)....35%
Chapin's Iron Planes.....50&10%
Miscellaneous Planes (Stanley R. & L. Co.).....30&5%
Union 60%

Plane Irons—
Wood Bench Plane Irons, list Dec. 12, '06.....25%
Buck Bros.....30%
Chapin-Stephens Co.....25%
Stanley R. & L. Co.....35%
Union 50%
L. & I. J. White.....20&5@25%

Planters, Corn, Hand—
Kohler's Eclipse.....℔ doz. $8.00

Plates—
Felloe .....lb.4@4¼¢
Self-Sealing Pie Plates (R. M. Co.), ℔ doz. $2.00.....50%

Pliers and Nippers—
Button Pliers.....75@75&10%
Gas Burner, per doz., 5 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.
Gas Pipe.. 7 8 10 12-in.
$2.00 $2.25 $2.75 $3.50
Acme Nippers.....50&5%
Cronk & Carrier Mfg. Co.:
American Button.....80%
Improved Button.....75&10%
Cronk's 60%
No. 80 Linemen's.....50%
Stub's Pattern.....45%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers and Tools.....40&5@40&10&5%
The Nettleton Mfg. Co. Reversible Cutting Nippers.....40%
P., S. & W. Tinners' Cutting Nippers 60%
Wm. Schollhorn Co.:
Bernard, 33⅓%; Elm City, 33⅓%; Paragon, 50%; Lodi, 50%.
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds.....40%
Vaughan & Bushnell Mfg. Co.:
Gas Burner, per doz., 5 in., $2.50; 6 in., $3.00.
Gas, per doz., 7 in., $3.50; 8 in., $3.75; 10 in., $4.50.
Nippers, Horseshoers' Cutting, 40%; Hoof Paring.....40%

Plumbs and Levels—
Chapin-Stephens Co.:
Plumbs and Levels.....30@30&10%
Chapin's Imp. Brass Cor..40@40&10%
Pocket Levels.....30@30&10%
Extension Sights.....30@30&10%
Machinists' Levels.....40@40&10%
Disston's Plumbs and Levels....60&10%
Disston's Pocket Levels.....60&10%
C. E. Jennings & Co.'s Iron.....33⅓%
C. E. Jennings & Co.'s Iron, Adjustable .....40&7½%
Stanley R. & L. Co.....40%
Stanley's Duplex.....35%
Woods' Extension.....33⅓%

Poachers, Egg—
Buffalo Steam Egg Poachers, ℔ doz., No. 1, $6.00; No. 2, $9.00; No. 3, $9.00; No. 4, $12.00.....50%

Points, Glaziers'—
Bulk and 1-lb. papers.....lb. 10¢
¼-lb. papers.....lb. 9¢@10¼¢
¼-lb. papers.....lb. 9¾¢@11¢

Pokes, Animal—
Ft. Madison Hawkeye.....℔ doz. $3.25
Ft. Madison Western.....℔ doz. $4.00

Police Goods—
Manufacturers' Lists...25@25&5%
Tower's 25%

Polish—Metal, Etc—
Glasbrite, No. 2, 5 lb can (powder), each, $1.25; ℔ doz., $12.00; No. 2, 10 lb can (cake), each, $2.50; ℔ doz., $24.00.
Prestoline Liquid, No. 1 (½ pt.), ℔ doz., $3.00; No. 2 (1 qu.), $9.00..40%
Prestoline Paste.....40%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ℔ doz. 50¢; ℔ gro. $4.50; ½ lb boxes, ℔ doz. $1.25; 1 lb boxes, ℔ doz. $2.25.
U. S. Liquid, 8 oz. cans, ℔ doz., $1.25.
Barkeepers' Friend Metal Polish, ℔ doz., $1.75.

Stove—
Black Eagle Benzine Paste, 5 lb cans, ℔ lb 10¢
Black Eagle, Liquid, ½ pt. cans.. ℔ doz. 75¢
Black Jack Paste, ¾ lb cans, ℔ gr. $9.00
Black Kid Paste, 5 lb can....each, $0.65
Ladd's Black Beauty Liquid, per 100 tins.....$8.75
Joseph Dixon's, ℔ gr. $5.75.....10%
Dixon's Plumbago.....℔ lb 8¢
Fireside .....℔ gr. $2.50
Gem, ℔ gr. $4.50.....10%
Japanese .....℔ gr. $3.50
Jet Black.....℔ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ℔ doz. $1.50
.Wynn's Black Silk:
Paste, cans, ℔ doz., 5 oz., $0.75; ½ lb, $1.00; 1 lb.....$1.75
Paste, ℔ 5 lb can.....$0.70
Liquid, cans, ℔ doz., 6 oz., $0.75; ½ pt., $1.00; 1 pt.....$1.75
Steel Range Enamel, ℔ doz., ¼ pt., $1.00; ½ pt., $1.25.

Poppers, Corn—
1 qt. Square..doz.$0.80; gro.$8.00
1 qt. Round..doz.$0.90; gro.$9.00
1½ qt. Square.doz.$1.00; gro.$10.00
2 qt. Square..doz.$1.20; gro.$12.00

Post Hole and Tree Augers and Diggers—
See also *Diggers, Post Hole, &c.*

Posts, Steel—
Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts.....each $1.30

Potato Parers—
See *Parers, Potato.*

Pots, Glue—
Enameled .....35&10%
Tinned .....30&10%

Powder—
In Canisters:
Duck, 1 lb.....each 45¢
Fine Sporting, 1 lb....each 75¢
Rifle, ½-lb.....each 15¢
Rifle, 1-lb.....each 25¢
In Kegs:
12½-lb. kegs.....$3.50
25-lb. kegs.....$4.50
King's Semi-Smokeless:
Keg (25 lb bulk).....$6.50
Half Keg (12½ lb bulk).....$3.50
Quarter Keg (6¼ lb bulk).....$1.90
Case 24 (1 lb cans bulk).....$8.50
Half case (1 lb cans bulk).....$4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk).....	$12.00	$15.00
Half Keg (12½ lb bulk)...	6.25	7.75
Quarter Keg (6¼ lb bulk).	3.25	4.00
Case 24 (1 lb cans bulk)..	14.00	17.00
Half case 12 (1 lb c. ba)..	7.25	8.75

Robin Hood Sm'less Shot Gun..50&20%

Presses—
Fruit and Jelly
Enterprise Mfg. Co.....20@25%

Seal Presses—
Morrill's No. 1, ℔ doz., $20.00.....50%

Pruning Hooks and Shears
See *Shears.*

Pullers, Nail—
Cyclops 50%
Miller's Falls, No. 3, ℔ doz., $12.00.....33⅓&10%
Morrill's No. 1, Nail Puller, ℔ doz. $20.00.....50%
Pearson No. 1, Cyclone Spike Puller, each $30.00.....50%
Scranton, Case Lots:
No. 2B (large).....$5.50
No. 3B (small).....$5.00
Smith & Hemenway Co.:
Diamond B, case lots, ℔ doz., Large, $9.00; Small, $7.50.
Giant No. 1, ℔ doz., $18; No. 1½, $16.50; No. 3, $15.....33⅓%
Staple Pullers, Utica and Davison 60%
Parrot Tack and Stub Puller, ℔ doz., 75c.: ℔ gro., $8.00

Pulleys, Single Wheel—

Inch	1½	1¾	2	3
Awning or Tackle, doz.	$0.30	.45	.60	1.05

Hay Fork, Swivel or Solid Eye. doz., 4 in., $1.25; 5 in., $1.55

Inch	2	2¼	2½
Hot House, doz...	$0.65	.85	1.20
Inch	1¼	1½	1¾	2
Screw, doz....	$0.16	.19	.23	.30
Inch	1¾	2	2¼	2½
Side, doz.....	$0.25	.40	.55	.60
Inch	1½	1¾	2	2½

Stowell's:
Ceiling or End, Anti-Friction..60&10%
Dumb Waiter, Anti-Friction..60&10%
Electric Light.....60%
Side, Anti-Friction.....60&10%

Sash Pulleys—
Common Frame; Square or Round End, per doz, 1¾ and 2 in.....16@17¢
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in....17@19¢
Acme, No. 35..1¾ in., 18½¢; 2 in., 20¼¢
Fox-All Steel, Nos. 3 and 7, 2 in.... ℔ doz. 90¢
Grand Rapids All Steel Noiseless..50%
Ideal .....70&5%
Niagara, No. 25, 1¾ in., 18½¢; 2 in., ...20½¢
No. 26, Trov..1¾ in., 14½¢; 2 in., 16½¢
Star, No. 26...1¾ in., 18½¢; 2 in., 20½¢
Tackle Blocks—See Blocks.

Pumps—
Cistern 60%
Pitcher Spout.....75&5@75&10%
Wood Pumps, Tubing, &c..45@50%
Barnes Dbl. Acting (low list)..40&10%
Barnes Pitcher Spout.....75&10%
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co.....$16.00
Daisy Spray Pump.....℔ doz. $6.50
Flint & Walling's Fast Mail Hand, (low list).....50%
Flint & Walling's Fast Mail (low list) 50%
Flint & Walling's Tight Top Pitcher. .....75&10%
National Specialty Mfg. Co., Measuring, Nos. 2, $6.00; 3, $5.50.....30%
Myers' Pumps (low list).....45%
Myers' Power Pumps.....45%
Myers' Spray Pumps.....45%

Pump Leathers—
Plunger and Lower Valve—Per gro.:

Inch...	2	2¼	2½	2¾
	$2.20	2.50	2.75	3.00
Inch...	3	3¼	3½	3¾	4
	$3.30	3.60	3.85	4.10	4.40

Plunger Cup Leathers—Per 100:

Inch...	2½	3	3½	4
	$2.75	3.85	5.00	6.00

Punches—
Saddlers' or Drive, good..... *doz. 50@75¢*
Spring, single tube, good quality .....$1.75@2.00
Revolving (4 tubes)..... *doz. $3.50@3.75*
Bemis & Call Co.'s Cast St'l Drive.50%
Morrill's Nos. 1AA, 1A, 1B, 1C, $15.00 .....50%
Hercules, 1 die, each $5.00.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Wm. Schollhorn Co.:
Belt and Ticket, Bernard, 33⅓%; Paragon, 50%; Lodi.....50%
Tinners' Hollow, P., S. & W. Co.33⅓%
Tinners' Solid, P., S. & W. Co., ℔ doz., $1.44.....50%

Rail—Barn Door, &c.—
Sliding Door, Painted Iron.... 2½@2¾¢
Sliding Door, Wrought Brass, 1⅛ in., lb., 36¢.....30%
Allith Mfg. Co.: Reliable Hanger Track 50%
Cronk's:
Double Braced Steel Rail..℔ ft. 3¼¢
O. N. T. Rail..... 3 ¢
Hinge Rail.....396¢
Griffin's:
xxx, ℔ 100 ft., 1 x 3-16 in., $3.00; 1¼ x 3-16 in., 3.50.
Hinged Hanger, ℔ 100 ft., 1 x 3-16 in., $3.10; 1¼ x 3-16 in., $3.80.
Lane's:
Hinged Track, ℔ 100 ft., 1 in., $3.40; 1¼ in., $3.96.
O. N. T., ℔ 100 ft., 1 in., $3.00; 1¼ in., $3.60; 1½ in., $4.00.
Standard, 1¼ in.....℔ 100 ft. $1.00
Lawrence Bros.:
℔ 100 ft. No. 201, $4.00; No. 202, $4.00
New York, 1 x 3-16 in., ℔ 100 ft. $3.00
McKinney's:
Hinged Hanger Rail, ℔ ft., 11¢.50%
None Better.....℔ ft. 3¾¢
Standard .....℔ ft. 4 ¢
Myers' Station Track.....60&5%
Richards' Mfg. Co.:
Common, 1 x 3-6 in., $3.00; 1¼ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail...60&10%
Lag Screw Rail, No. 65.....50%
Gauge Trolley Track, ℔ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.
No. 50.....60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.
Stowell's:
Cast Rail.....℔ ft. 2¼¢
Steel Rail, Plain.....25%
Wrought Bracket, 1 3-16 in.....℔ ft. 3¢
Wrought Bracket, 1¼ x 5-16..℔ ft. 7¢
Swett's Hylo, ℔ ft. 11¢.....50%
P. L. B. Steel Rail.....℔ 100 ft. $3.00
No. 0, 1 x 3-16.....℔ 100 ft. $3.00

Rakes—
NOTE.—Many goods are sold at net prices.
Fort Madison Red Head Lawn....$3.25
Fort Madison Blue Head Lawn....$2.70
Jackson Lawn, 29 and 30 teeth, ℔ doz., net.....$4.25
Cronk's:
New Champion Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00..75%
Victor Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00.....80%
Queen City Lawn, ℔ doz., 20 teeth, $2.85; 24, $3.00.....net
Anticlog Lawn, ℔ doz.....$4.00
Malleable Garden.....70&10%
Ideal Steel Garden, ℔ doz., 12 teeth, $15.00; 14, $16.00; 16, $18.00.....80%
Kohler's:
Lawn Queen, 20-tooth....℔ doz. $2.90
Lawn Queen, 24-tooth....℔ doz. $3.00
Paragon, 20-tooth.....℔ doz. $2.70
Paragon, 24-tooth.....℔ doz. $2.75
Steel Garden, 14-tooth....℔ doz. $2.40
Malleable Garden, 14-tooth, ℔ doz. $1.75@2.00

Rasps, Horse—
Disston's 75%
Heller Bros.'.....70&5@70&10&5%
Liveright Bros.' Gold Medal.70&10@75%
McCaffrey's American Standard, ...60&10&5%
New Nicholson.....70&10@75%
See also Files.

Razors—
Liana Bo-ras-ic.....60%
Fox Razors, ℔ doz., No. 42, $30.00; No. 44, $20.00; No. 82, Platina, $25.00. } 40%
Red Devil.....50%
Silberstein:
Carbo Magnetic, $21.00; Griffon, No. 65, $13.50; Griffon, No. 00, $12.00; all other Razors, 40%.

Safety Razors—
Kampfe Bros.:
Star Safety, 35%; Star Interchangeable, 25%; Star Safety Corn, 25%.
Silberstein 40%

Reels, Fishing—
Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo.....20%
Aluminum, German Silv., Bronze.25%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 8.....25%
4 N, 6 PN, 24 N, 28 PN.....20%
2904 P., 33⅓%; 2904 PN, 33⅓%; 0924 N., 33⅓%; 02084 N., 33⅓%; 002904 PN., 33⅓%; 802 N., 33⅓%.
986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....20%
304 P, 304 PN, 00304 P, 00304 PN.33⅓%

Registers—*List July 1, 1903.*
Japanned, Electroplated and Bronzed 66⅔%
White Porcelain Enamel....60%
Solid Brass or Bronze Metal, 40&10%

Revolvers—
Single Action.....95¢@$1.00
Double Action, except 44 cal.$1.80
Double Action, 44 caliber....$2.00
Automatic $3.50
Hammerless $4.00

Riddles, Hardware Grade
16 in.....*per doz.*$2.50@$2.75
17 in.....*per doz.*$2.75@$3.00
18 in.....*per doz.*$3.00@$3.25

Rings and Ringers—
Bull Rings—

	2	2½	*3 inch.*
Steel	$0.70	0.75	0.80 *doz.*
Copper	$1.15	1.35	1.75 *doz.*

Rea's Improved Self-Piercing, ℔ doz., Copper, 2 in., $1.25; 2½ in., $1.50; 3 in., $1.75.

Hog Rings and Ringers—
Hill's Rings, gro. boxes.$4.00@$4.50
Hill's Ringers, Gray Iron..... *doz. 50@55¢*
Hill's Ringers, Malleable Iron.. *doz. 70@75¢*
Blair's Rings...*per gro.*$4.75@5.25
Blair's Ringers.per doz.$0.60@ .65
Brown's Rings..*per gro.*$5.00@5.50
Brown's Ringers.per doz.$0.60@ .65

Rivets and Burrs—
Copper .....33⅓@35%
Carriage, Coopers', Tinners, &c.: Black .....70&10%
Metallic Tinned.....70%

Bifurcated and Tubular—
Assorted in Boxes.
Bifurcated, per doz. boxes, pasteboard boxes, 23@25¢; Tin boxes, 29@32¢.
Tubular, per doz. boxes, 50 count, 72¢; 100 count, 51@58¢.

Rollers—
Acme, Stowell's Anti-Friction.....50%
Cronk's Stay No. 65, $0.90; No. 50 .....$1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56.....$0.84
Lane's Stay.....40%
Richards' Stay:
Handy Adj. and Reversible No. 53.75¢
O. K. Adj. and Reversible No. 58.50¢
Lag Screw, Nos. 55 and 57.....50%
Underwriters', Nos. 59, 60.....50%
Favorite, No. 54.....60%
Stowell's Barn Door Stay..℔ doz. $1.00
Swett's Anti-Friction 50%
Screw and Spike Stay.....℔ doz. 65¢
Hinge Adjustable Stay.....℔ doz. 90¢

Rope—
Manila, 7-16 in. diam. and larger: Pure .....lb., 13@13½¢
Sisal, 7-16 in. diam. and larger: Pure .....lb., 9½¢
Sisal, 7-16 in. diam. and larger: No. 2 quality.....lb., 7¾@8¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse: Mixed .....lb., 7¾@8¢
Pure .....lb., 9¼¢
Sisal, Tarred, Medium Lath Yarn, Coarse and Untarred: Mixed .....lb., 7@7½¢
Pure .....lb., 8¢
Cotton Rope: Best, ¼-in. and larger...18@20¢
*Medium, ¼-in. and larger.*16@17¢
Common, ¼-in. and larger..10¢
In coils, ½¢ advance.
Jute Rope: Thread, No. 1, ¼-in. & up, lb., 9¢
Thread, No. 2, ¼-in. & up, lb.,8½¢
Old Colony Manila Transmission Rope .....℔ lb 17½¢

Wire Rope—
Galvanized .....37½&2½%
Plain .....45&2½%

Ropes, Hammock—
Covert Mfg. Co.:
Jute, 35%; Sisal.....30%

Rules
Boxwood .....60@60&10%
Ivory .....35&10@35&10&5%
Chapin-Stephens Co.:
Boxwood 60%
Flexifold 40%
Ivory .....25@25&10%
Miscellaneous .....55@55&10%
Stephens' Combination.....55%
Stationers' 10%
Keuffel & Esser Co.:
Folding, Wood.....35&10%
Folding, Steel.....33⅓&10%
Lufkin's Steel.....50&10%
Lufkin's Lumber.....60%

Stanley R. & L. Co.:
Boxwood 60%
Ivory 45%
Miscellaneous 60%
Zig Zag 40%
Zig Zag, Pin Joint 42½%
Upson Nut Co.:
Boxwood ..... 60@60&10%
Ivory ..... 35&10@35&10&10%

Sash Balances—
See *Balance, Sash.*

Sash Locks—
See *Locks, Sash.*

Sash Weights—
See *Weights, Sash.*

Sausage Stuffers or Fillers
See *Stuffers or Fillers, Sausage.*

Saw Frames—
See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—
Atkins:
Circular 45%
Band ..... 50@50&10%
Butcher Saws 50%
Cross Cuts 40%
One-Man Cross Cut 40%
Narrow Cross Cut 50%
Hand, Rip and Panel ..... 35&5%
Miter Box and Compass 40%
Mulay, Mill and Drag 45%
Chapin-Stephens Co.:
Turning Saws and Frames..30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws..... 30&10&10%
Disston's:
Circular, Solid and Ins'ted Tooth..50%
Band, 2 to 18 in. wide 60%
Band, ¼ to 1¾ 60%
Crosscuts 45%
Narrow Crosscuts 50%
Mulay, Mill and Drag 50%
Framed Woodsaws 25%
Woodsaw Blades 25%
Woodsaw Rods, Tinned 15%
Hand Saws, Nos. 12, 99, 9, 16, d100, 108, 120, 76, 77, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c. 25%
Butcher Saws and Blades 30%
C. E. Jennings & Co.'s:
Back Saws 25%
Butcher Saws 30%
Compass and Key Hole Saws..35&5%
Framed Wood Saws 30%
Hand Saws ..... 20&2½%
Wood Saw Blades 35%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Massachusetts Saw Works:
Victor Kitchen Saws..... 40&10&50%
Butcher Saws Blades..... 35@40%
Peace & Richardson's Hand Saws...30%
Simonds':
Circular Saws 45%
Crescent Ground Cross Cut Saws..30%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws..45%
Band Saws 50%
Back Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand 45%
Compass, Key Hole, &c..25@25&7½%
Wood Saws ..... 40&7½%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws 50%

Hack Saw Blades and Frames—
Atkins' Hack Saw Blades A A A..25%
Disston's:
Concave Blades 25%
Keystone Blades 35%
Hack Saw Frames 30%
Simonds File Co. 35%
C. E. Jennings & Co.'s
Hack Saw Frames, Nos. 175, 180.... 40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%
Goodell's Hack Saw Blades.....40&10%
Griffin's Hack Saw Frames..35&5&10%
Griffin's Hack Saw Blades....35&5&10%
Star Hack Saws and Blades.....15&10%
Sterling Hack Saw Blades....30&10&5%
Sterling Hack Saw Frames..30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00..10%
Victor Hack Saw Blades 25%
Victor Hack Saw Frames 40%

Scroll—
Barnes, No. 7, $15 ..... 25%
Barnes' Scroll Saw Blades 60%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20 ..... 20%
Lester, complete, $10.00 ..... 15&10%
Rogers, complete, $3.50 and $4.00.. 15&10%

Scales—
Family, Turnbull's .... 50@50&10%
Counter:
Hatch, Platform, ½ oz. to 4 lbs. ..... doz. $5.50
Two Platforms, ½ oz. to 8 lbs. ..... doz. $16.00
Union Platform, Plain $1.70@1.90
Union Platform, Shpd. $1.85@2.15
Chatillon's:
Eureka 35%
Favorite 40%
Crocers' Trip Scales 60%
Chicago Scale Co.:
The Little Detective..... 25 lbs 50%
Union or Family No. 2 ..... 60%
Portable Platform (reduced list)..50%
Wagon or Stock (reduced list)..25@35%
The Standard Portables 45%
The Standard R. R. and Wagon ..... 50&10%

Scrapers—
Box, 1 Handle ..... doz. $2.00@2.25
Box, 2 Handle ..... doz. $2.50@2.60
Ship .... Light, $2.00; Heavy, $2.50
Adjustable Box Scraper (S. R. & L. Co.), $6.00 ..... 45%
Chapin-Stephens Co., Box..30@30&10%

Screws—Bench and Hand
Bench, Iron, doz., 1 in., $2.50@2.75; 1⅛, $3.00@3.25; 1¼, $3.50@3.75
Bench, Wood ..... 20@20&10%
Hand, Wood ..... 20@20&10%
R. Bliss Mfg. Co., Hand..20&5@20&10%
Chapin-Stephens Co., Hand 20%

Coach, Lag and Hand Rail—
Lag, Cone Point, list Oct. 1, '99 ..... 75&15%
Coach, Gimlet Point, list Oct. 1, '99 ..... 75&10%
Hand Rail, list Jan. 1, '81 .... 70&10@75%

Jack Screws—
Standard List ..... 70&10@75%
Millers Falls ..... 50&10&10%
P., S. & W. 50%
Swett Iron Works ..... 75@80%

Machine—
List Jan. 1, '98:
Flat or Round Head, Iron, Brass or Bronze....50@50&10%
Fillister Head, Iron, Brass or Bronze ..... 40@40&10%

Set and Cap—
Set (Iron) ..... 70&10@71½%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap ..... 70&10@71½%
Hex. Hd. Cap ..... 70&10@71½%
Rd. Hd. Cap ..... 50@71½%
Fillister Hd. Cap ..... 60@71½%

Wood—
List July 23, 1903.
Flat Head, Iron ..... 87½@5@..%
Round Head, Iron ..... 85@5@..%
Flat Head, Brass ..... 82½@5@..%
Round Head, Brass ..... 80@5@..%
Flat Head, Bronze ..... 77½@5@..%
Round Head, Bronze ..... 75@5@..%
Drive Screws ..... 87½@5@..%

Scroll Saws—
See *Saws, Scroll.*

Scythes—
	Per doz.
Grass, No. 1, Plain	$6.25@6.75
Clipper, Bronzed Webb	$6.50@7.00
No. 3 Clipper, Pol'd Webb	$6.75@7.25
No. 6 Clipper and Solid Steel	$7.00@7.50
Bush, Weed and Bramble, No. 2	$6.50@7.00
Grain, No. 1	$8.25@8.75
Bronzed Webb, No. 1	$8.50@9.00
Nos. 3 and 4 Clipper, Grain	$8.75@9.25
Solid Steel, No. 6	$9.25@9.75

Seeders, Raisin—
Enterprise ..... 25@30%

Sets— Awl and Tool—
Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7 ..... 50%
C. E. Jennings & Co.'s Model Tool Holders 30%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18....15&10%

Garden Tool Sets—
Ft. Madison Three Plows, Hoe, Rake and Shovel ..... ℔ doz sets $9.00

Sets, Nail—
Octagon ..... gro. $3.50@3.75
Buck Bros. 27½%
Cannon's Diamond Point, ℔ gro, $12, 40&10%
Mayhew's ..... ℔ gro. $9.00
Snell's Corrugated, Cup Pt.....40&10%
Snell's Knurled, Cup Pt.....40&10%
Victor Knurled Cup Pt....℔ gro. $7.50

Rivet—
Regular list ..... 75@75&10%

Saw—
Atkin's:
Criterion 40%
Adjustable 40%
Disston's Star, Monarch and Triumph 30%
Morrill's No. 1 ..... $15.00
Nos. 3 and 4, Cross Cut.....$20.60
No. 5, Mill $30.00
Nos. 10, 11, 95 ..... $15,60
No. 1 Old Style $10.00
Special $16.25
Giant Royal Cross Cut.....℔ doz. $8.00
Royal, Hand ..... ℔ doz. $4.50
Taintor Positive ..... ℔ doz. $6.75
(Morrill's, Disston's, Taintor: 25 & 50)

Shaving—
Fox Shaving Sets, No. 30 ..... ℔ doz., net, $24.00
Smith & Hemenway Co.'s 60%

Sharpeners, Knife—
Chicago Wheel & Mfg. Co. 70%
Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ℔ doz $1.50
Mounted Kitchen Sand Stone, ℔ doz $1.50
Natural Grit Carving Knife Hones, ℔ doz $3.00
Quick Cut Emery Carving Knife Hones, ℔ doz $1.50
Quick Edge Pocket Knife Hones, ℔ doz $2.50
(Pike Mfg. Co.: 25 & 50)

Skate—
Smith & Hemenway Co., Eureka..20%

Shaves, Spoke—
Iron ..... doz. $1.10@1.25
Wood ..... doz. $1.75@2.25
Bailey's (Stanley R. & L. Co.)....45%
Razor Edge (Stanley R. & L. Co.), Iron, 50%; Wood 55%
Chapin-Stephens Co. ..... 30@30&10%
Goodell's, ℔ doz. $9.00 ..... 15&10%
Wood's F1 and F2 ..... 50%

Shears—
Cast Iron	7	8	9 in.
Best	$16.00	18.00	20.00 gro.
Good	$13.00	15.00	17.00 gro.
Cheap	$5.00	6.00	7.00 gro.

Straight Trimmers, &c.:
Best quality Jap .... 70@70&10%
Best quality, Nickel .. 60@60&10%
Fair quality, Jap .... 80@80&5%
Fair quality, Nickel .. 75@75&10%
Tailors' Shears ..... 40@40&10%
Acme Cast Shears ..... 40@40&5%
Heinisch's Tailor's Shears 10%
Wilkinson Shear & Cutlery Co.:
Sheep, 1900 list ..... 30&10&5%
Grass ..... 50&10%
Horse or Mule ..... 50&10%

Tinners' Snips—
Steel Blades ..... 20&5@20&10%
Steel Laid Blades ..... 40&10@50%
Forged Handles, Steel Blades, Berlin, 50%
Heinisch's Snips 40%
Jennings & Griffin Mfg. Co.'s, 6½ to 10 in. 50%
Niagara Snips 40%
P., S. & W. Forged Handles 20%

Pruning Shears—
Cronk's Hand Shears 33⅓%
Cronk's Wood Handle Shears..... 33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz. $18.00 ..... 25%
Disston's Pruning Hook only, ℔ doz. $12.00 ..... 25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades 40%
P., S. & W. Co. 30%
Wilkinson Shear & Cutlery Co.:
Hedge, Wilcut Brand ..... 60&10%
Lawn and Border, Wilcut Brand, 60&10%

Sheaves—Sliding Door—
Stowell's Anti-Friction 50%
Reading 40%
R. & E. list 15%
Wrightsville Hatfield Pattern..... 87½%

Sliding Shutter—
Reading list 40%
R. & E. list 10%

Shells—Shells, Empty—
Brass Shells, Empty:
Climax, 10 and 12 gauge ..... 65&10%
Club, Rival, 65&5%; First Quality, 60&5%
Paper Shells, Empty:
New Rapid, 10, 12, 16 and 20 gauge, 25&10%
Climax, 10 and 12 gauge; Acme, 10, 12, 16 and 20 gauge; Ideal, 10, 12, 16 and 20 gauge; Leader grade, 25&5%
Union, League, 12 and 12 gauge; Rival Grade 25%
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge ..... 20&5%
Challenge, Monarch, 10, 12, 16 and 20 gauge; League, Union, 14, 16 and 20 gauge; Repeater Grade..20%
Expert, 10, 12, 16 and 20 gauge, 33⅓&5%
Robin Hood, Low Brass ..... 20&5%
Robin Hood, High Brass ..... 30&5%
Indian, for Black Powder ..... 25&5%

Shells, Loaded—
Loaded with Black Powder .. 40%
Loaded with Smokeless Powder, medium grade ..... 40&5%
Loaded with Smokeless Powder, high grade ..... 40&10&10%
Robin Hood:
Smokeless Robin Hood, Low Brass ..... 40&10%
Smokeless Comets, High Brass, 40&10&10&5%
Indian, Black Powder ..... 40&5%
Union Metallic Cartridge Co.:
New Club, Black Powders 40%
Nitro Club, Smokeless Powders.40&5%
Arrow, Smokeless Powders.40&10&10%
Winchester:
Smokeless Repeater Grade..... 40&5%
Smokeless Leader Grade...40&10&10%
Black Powder 40%

Shingles, Metal— Per Sq.
Edwards Mfg. Co.:	Painted.	Galv.
14 x 20	$1.25	$6.00
10 x 14	4.50	6.25
7 x 10	4.75	6.50

Wheeling Corrugating Co.:

Dixie, 14 x 20 in...	$4.25	$5.50
Dixie, 10 x 14 in....	4.50	6.00
Dixie, 7 x 10 in....	5.00	6.75

Shoes, Horse, Mule, &c.—
F.o.b. Pittsburgh:
Iron ..... per keg. $4.10
Steel ..... per keg. $3.85
Burden's, all sizes ..... ℔ keg $3.90

Shot—
	25-lb. bag.
Drop, up to B	$1.95
Drop, B and larger	2.20
Buck	2.20
Chilled	2.20
Dust	2.40

Shovels and Spades—
Association List, Nov. 15, 1902..40%

Snow Shovels—
Long Handle ..... $2.75@$3.00
Wood and Mall, D. Handle, ... $3.25@$3.50

Sieves and Sifters—
Hunter's Imitation ..... gro. $9.50@10.00
Hunter's Genuine ..... per gro. $12.00@12.50

Buffalo Metallic Blued, R. M. Co., ℔ gr.		
14&16	16&18	18&20
$13.20	$13.50	$14.40

Sieves, Seamless Metallic
Per dozen.

Mesh	14	16	18	20
Iron Wire	$1.05	1.05	1.10	1.20
Tinned Wire	$1.15	1.15	1.20	1.30

Sieves, Wooden Rim—
Nested, 10, 11 and 12 Inch.
Mesh 18, Nested .... doz. $0.90@0.95
Mesh 20, Nested .... doz. $1.00@1.05
Mesh 24, Nested .... doz. $1.30@1.40

Sinks, Cast Iron—
Painted, Standard list:
12 x 12 to 22 x 36 in 60%
20 x 40 to 24 x 50 in 50%
24 x 60 to 24 x 120 in 50%
Barnes' low list:
Up to and including 20 x 36 in....50%
20 x 40 to 24 x 50 in 45%
NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—
Cast Iron ..... 70@75&10%
Steel ..... 40@45%

Slates, School—
Factory Shipments.
"D" Slates ..... 50@50&10%
Eureka, Unexcelled Noiseless .. 60&5 tens
Victor A, Noiseless .60&½ tens &5%

Slaw Cutters—See *Cutters.*

Snaps, Harness—
German ..... 40@40&10%
Covert Mfg. Co.:
Derby, 25%; Yankee, 30&2%; Yankee Roller, 30&2%
High Grade, 40%; Trojan 40%
Jockey 25%
Oneida Community:
Harness Snaps, 1 inch ..... 60&5%
Swivel Snaps 60%
Swivels 50%

Snaths—
Scythe 50%

Snips, Tinners—See *Shears.*

Spoons and Forks—
Silver Plated—
Good Quality ..... 50&10@60&5%
Cheap ..... 60@60&10%
International Silver Co.:
1847 Rogers Bros., 40&10%; Rogers & Hamilton ..... 50&10%
Rogers & Bro., William Rogers' Eagle Brand ..... 50&10%
Anchor, Rogers Brand 60%
Wm. Rogers & Son ..... 60&10%

Miscellaneous—
German Silver ..... 60@60&5%
Cattaraugus Cutlery Co.:
Seneca Silver 50%

Tinned Iron—
Teas ..... per gro. 45@50¢
Tables ..... per gro. $0.50@$1.00

Springs— Door—
Bardsley's Spring and Check 40%
Chicago (Coil) ..... 40&10%
Gem (Coil) 20%
Pullman (Coil) 35%
Reliance (Coil) ..... 40&10%
Star (Coil) 30%
Torrey's Rod, 39 in. ..... ℔ doz. $1.10

Carriage, Wagon, &c.—
1¼ in. and Wider:	Per lb
Black	4¼@4½¢
Half Bright	4¼@4½¢
Bright	4¾@5¢

Painted Seat Springs:
1½ x 2 x 26 ..... per pr. 47@49¢
1½ x 3 x 28 ..... per pr. 69@71¢

Sprinklers, Lawn—
Enterprise ..... 25@30%
Philadelphia No. 1, ℔ doz. $12; No. 2, $15; No. 3, $20 ..... 30%
Pfeuger & Henger Mfg. Co.:
Cactus, 65&5%; Japanese, 70&5%; Nationals, 60&5%

Squares—
Nickel plated .. } List Jan. 5, 1900.
Steel and Iron . } 75@—%
Rosewood Hdl. Try Square and T-Bevels ..... 60&10&10@70%
Iron Hdl. Try Squares and T-Bevels ..... 40&10@40&10&10%
Disston's Try Squares and Bevels, Rosewood Handle, 60&10%; Iron Stock and Bevel 15%
Winterbottom's Try and Miter, No. 1, 35%; No. 2 ..... 45%

Squeezers, Lemon
Wood, Common, gro., No. 0, $5.25@$5.50; No. 1, $6.25@$6.50.
Wood, Porcelain Lined:
Cheap ..... doz. $1.00
Good Grade ..... doz. $1.25
Tinned Iron ..... doz. $0.75@1.25
Iron, Porcelain Lined ... doz. $1.75

Staples—
Barbed Blind ..... lb. 6@6½¢
Electricians', Association list .. 80&10&10&10%
Fence Staples, Plain, $2.25; Galvanized $2.55
Poultry Netting Staples ..... per lb. 3½@3½¢

Steels, Butchers'—
Dick's 30%
Foster Bros. 30%
C. & A. Hoffmann's 40%

Steelyards — ..... 50@30&10%

Stocks and Dies—
Blacksmiths' ..... 50@50&10%
Curtis Rev'ble Ratchet Die Stock..25%
Derby Screw Plates 25%
Green River 25%
Lightning Screw Plate 25%
Little Giant 25%
Reece's New Screw Plates 25%

Stoners, Cherry—
Enterprise ..... 25@30%

Stones—Oil, &c.
Chicago Wheel & Mfg. Co., 1904 list:
Gem Oil, Double Grit 65%
Gem Axe, Single or Double Grit..65%
Gem Slips 65%
Gem Razor Hones 50%
Pike Mfg. Co., 1904 list: ℔ lb.
Arkansas St. No. 1, 3 to 5½ in..$2.80
Arkansas St. No. 1, 5½ to 8 in..$3.50
Arkansas Slips No. 1 ..... $4.00
Lily White Washita, 4 to 8 in..60¢
Rosy Red Washita, 4 to 8 in..60¢
Washita St., Extra, 4 to 8 in..50¢
Washita St., No. 1, 4 to 8 in..40¢
Washita St., No. 2, 4 to 8 in..30¢
Lily White Slips ..... 90¢
Rosy Red Slips ..... 90¢
Washita Slips, Extra ..... 80¢
Washita Slips, No. 1 ..... 70¢
Washita Slips, No. 2 ..... 40¢
(Pike Mfg. Co.: 33⅓%)
India Oil Stones (entire list)....33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit 33⅓%
Quickcut Emery and Corundum Axe Stone, Double Grit 33⅓%
Quickcut Emery Rubbing Bricks 33⅓%
Hindostan No. 1, R'g'lar. ℔ lb 8¢
Hindostan No. 1, Small.. ℔ lb 10¢
Axe Stones (all kinds) .....
Turkey Oil Stones, Extra, 5 to 8 in. ..... ℔ lb 80¢
Queer Creek Stones, 4 to 8 in. 20¢
Queer Creek Slips ..... 40¢
Sand Stone ..... 8¢
(Hindostan, Turkey, Queer Creek, Sand: 25&5)

Scythe Stones—

Chicago Wheel & Mfg. Co.:
Gem, ₩ gro., 10 in., $8.00; 12 in., $10.80.
Norton Alundum Scythe Stones:
Less than 10 gross lots... ₩ gro. $6.00
Lots of 10 gross or more.. ₩ gro. $4.50
Pike Mfg. Co., 1901 list:
Black Diamond S. S.. ₩ gro. $12.00
Lamoille S. S..... ₩ gro. $11.00
White Mountain S. S. ₩ gro. $9.00
Green Mountain S. S. ₩ gro. $6.00
Extra Indian Pond S.S. ₩ gro. $7.50
No. 1 Indian Pond S.S. ₩ gro. $7.00
No. 2 Indian Pond S.S. ₩ gro. $4.50
Leader Red End S. S. ₩ gro. $4.50
Quick Cut Emery.... ₩ gro. $10.00
Pure Corundum..... ₩ gro. $18.00
Crescent $7.00
Emery Scythe Rifles, 2 Coat, $8
Emery Scythe Rifles, 3 Coat, $10
Emery Scythe Rifles, 4 Coat, $12
Balance of 1904 list 33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers..... ₩ gro. $9.00

Stops— Bench—

Millers Falls..... 15&10%
Morrill's, ₩ doz., No. 1, $10.00..... 50%
Morrill's, No. 2, $12.50..... 50%

Door—

Chapin-Stephens Co..... 60@60&10%

Plane—

Chapin-Stephens Co..... 20%

Straps— Box—

Cary's Universal, case lots....20&10&10%

Stretchers, Carpet—

Cast Iron, Steel Points, doz. 60@60&10%
Socket ..... doz. $1.00
Bullard, ₩ doz..... $4.00
Excelsior Stretcher and Tack Hammer Combined, ₩ doz. $6.00..... 20%

Woven Fence—

Franklin..... ea, $3.75

Strops, Razor—

Star Diagonal Strop..... 25%

Stuffers, Sausage—

Enterprise Mfg. Co..... 25@25&7½%
National Specialty Co., list Jan. 1, 1902 ..... 30&5%

Sweepers, Carpet—

National Sweeper Co.: ₩ doz.
Louis XV, Roller Bearing, Gold Plated $120.00
Hepplewhite, Roller Bearing, Silver Plated..... $72.00
Sheraton, Roller Bearing, N'kel. $60.00
Ye Mission, Roller Bearing, Oxidized Coppered..... $36.00
Transparent, Roller Bearing, Plate Glass top, Nickeled..... $36.00
National Queen, Roller Bearing, Fancy Veneers..... $27.00
Loyal, Roller Bearing, Veneers, Nickeled $25.00
Triple Medal, Roller Bearing, Nickeled $24.00
Marion, Roller Bearing, N'kel. $24.00
Marion Queen, Roller Bearing, Nickeled $21.00
Monarch, Roller Bearing, N'kel. $22.00
Monarch, Roller Bearing, Jap. $20.00
Perpetual, Regular B'r'gs, N'kel. $20.00
Perpetual, Regular B'r'gs, Jap. $18.00
Monarch Extra (17 in. case), Roller Bearing, Nickeled..... $36.00
Monarch Extra (17 in. case), Roller Bearing, Japanned..... $33.00
Auditorium (26 in. case), Roller Bearing, Nickeled..... $54.00
Mammoth (30 in. case), Roller Bearing, Nickeled..... $60.00

NOTE.—Rebates: 50c per dozen on three-dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots; $3.50 per dozen on twenty-five-dozen lots.

Streator Metal Stamping Co.:
Eureka Japanned ..... ₩ doz. $15.00
Model E, Sanitaire..... ₩ doz $25.00
Model A, Sterling..... ₩ doz. $25.00
Model B, Sterling, Nickeled..... ₩ doz. $23.00
Model B, Sterling, Japanned..... ₩ doz. $21.00
Model C, Sterling..... ₩ doz. $21.50
Model D, Sterling..... ₩ doz. $19.50

Tacks, Finishing Nails, &c.

New List, May 1, 1905.
American Carpet Tacks.. 90&30%
American Cut Tacks..... 90&30%
Swedes Cut Tacks..... 90&30%
Swedes' Upholsterers'.... 90&40%
Gimp Tacks..... 90&40%
Lace Tacks..... 90&40%
Trimmers' Tacks..... 90&30%
Looking Glass Tacks..... 65%
Bill Posters' and Railroad Tacks, 90&40%
Hungarian Nails..... 80&20%
Finishing Nails..... 70%
Trunk and Clout Nails..... 80%

NOTE.—The above prices are for Standard Weights. An extra 5% is given on Medium Weights, and an extra 10&5% is given on light weights.

Miscellaneous—

Double Pointed Tacks..... 90&5 or 5 tens

See also Nails, Wire.

Tanks, Oil and Gasoline—

Each R. M. Co.: Gal.	Oil Emerald	Oil Queen City
30	$3.40	$3.65
60	$4.25	$4.50

Wilson & Friend Co.: Gal.	Gasoline	Oil
30	$2.75	$3.00
60	$3.50	$4.00
120	$5.00	$5.75

Tapes, Measuring—

American Asses' Skin ..50@—%
Patent Leather..... 25@30&5%
Steel ..... $3 1-3&5%
Chesterman's ..... 25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin..... 40&10@50%
Favorite, Duck and Leather..... 25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.
Lufkin's:
Asses' Skin..... 40&10@50%
Metallic ..... 30@30&5%
Patent Bend, Leather.... 25&5@25&10%
Pocket ..... 40@40&5%
Steel ..... 33⅓@35%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc. 25%
Chesterman's Steel, No. 1038L, etc. 35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger... per 100 lbs. $2.75@$3.00

Thermometers—

Tin Case.....80&10@80&10&5%

Ties, Bale—Steel Wire—

Single Loop.....80&10&5%
Monitor, Cross Head, &c. 70&2½%

Brick Ties—

Niagara Brick Ties..... 25&10%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White..... 20@20&5%

Haying—

Myers' Hay Tools..... 45%
Stowell's Hay Carriers, 50%; Hay Forks, 50%; Fork Pulleys, 50%.

Miniature—

Smith & Hemenway Co.'s, Davidson 25%

Saw—

Atkins' Cross Cut Saw Tools....35&5%
Simonds' Improved..... 33⅓%
Simonds' Crescent..... 25%

Ship—

L. & I. J. White..... 25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro.... $11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50

Game—

Imitation Oneida.....70&10%
Newhouse ..... 40@40&5%
Hawley & Norton..... 65%
Victor ..... 70&10%
Oneida Community Jump..... 50%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 12¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, ₩ doz., $13.25; case of 24 ..... $11.50 doz.
No. 3, Rat, ₩ doz., $6.50; case of 50 ..... $5.75 doz.
No. 3½, Rat, ₩ doz. $5.25; case of 72 ..... $4.70 doz.
No. 4, Mouse, ₩ doz. $3.85; case of 150 ..... $3.00 doz.
No. 5, Mouse, ₩ doz. $3.00; case of 150 ..... $2.25 doz.

Trimmers, Spoke—

Wood's E I..... 50%

Trowels—

Disston Brick and Pointing..... 25%
Disston Plastering..... 20%
Disston "Standard Braud" and Garden Trowels..... 30%
Kohler's Steel Garden Trowels, ₩ gro., 5 in., $4.80; 6 in., $6.00.
Never-Break Steel Garden Trowels.. ₩ gro. $6.00
Rose Brick and Plastering..... 25&5%
Woodrough & McParlin, Plastering 25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern..... 50&10%
Western Pattern..... 60&10%
Handy Trucks..... ₩ doz. $16.00
Grocery ..... ₩ doz. $15.00
Daisy Stove Trucks, Improved Pattern ..... ₩ doz. $18.50
McKinney Trucks..... each $10.00
Model Stove Trucks..... ₩ doz. $18.50

Tubs, Wash—

M'f'gr's list, price per gross.

No.	0	1	2	3
Galvanized,	$6½	$76	$8½	$96
Galvanized Wash Tubs (R. M. Co.): No.	1	2	3	10
Per doz., net.	$5.70	6.30	7.20	6.60

No.	20	30
Per doz., net.	7.20	8.10

Twine, Miscellaneous—

Flax Twine:
No. 9, ¼ and ½-lb. Balls.23@25¢
No. 12, ¼ and ½-lb. Balls.21@22¢
No. 18, ¼ and ½-lb. Balls.18@20¢
No. 24, ¼ and ½-lb. Balls.17@19¢
No. 36, ¼ and ½-lb. Balls.16@18¢
Chalk Line, Cotton ½-lb. Balls ..... 30@31¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz..... 11@19¢
Cotton Wrapping, 5 Balls to lb.. according to quality... 15½@23¢
American 2-Ply Hemp, ¼ and ½-lb. Balls..... 14½@15½¢
American 3-Ply Hemp. 1-lb. Balls ..... 15½@16½¢
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine) .10½@11½¢
India 3-Ply Hemp, 1-lb. Balls 10½@11½¢
India 3-Ply Hemp, 1½-lb. Balls. 10@11¢
2, 3, 4 and 5-Ply Jute. ½-lb. Balls ..... 13½@14½¢
Mason Line, Linen, ½-lb. Bls.17¢
No. 26½ Mattress, ¼ and ½-lb. Balls, according to quality. 30@60¢
Wool, 3 to 6 ply....B 9¢; A 10¢

Vises—

Solid Box.....50@50&10%

Parallel—

Athol Machine Co.:
Simpson's Adjustable..... 40%
Standard 40%
Amateur 25%
Columbian Hdw. Co..... 40%
Emmert Universal:
Pattern Makers' No. 1, $15.00; No. 2, $12.50.
Machinist and Tool Makers' No. 4A, $12.50; No. 6A, $10.00; No. 10A, $22.50.
Presto Quick Acting Adjustable Jaw, 25@25&10%; Solid Jaw, 35@35&10%
Tiger Machinists'..... 40%
Fisher & Norris Double Screw, net, each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00.
Fulton Mach. & Vise Co.:
Reed, Swivel..... 25%
Star, Solid Jaw..... 40%
Hollands':
Machinists' ..... 40@40&5%
Keystone ..... 65&40&10%
Lewis Tool Co.:
Adjustable Jaw..... 30%
Monarch, 50%; Solid Jaw..... 50%
Massey Vise Co.:
Clincher 40%
Perfect, 15%; Lightning Grip..... 15%
Merrill's 20%
Millers Falls Oval Slide Pattern.60&10%
Parker's:
Victor, 20@25%; Regulars..... 20@25%
Vulcan's ..... 40@45%
Combination Pipe..... 55@60%
Prentiss ..... 20@25%
Snediker's X. L..... 33⅓%
Stephens' 33⅓%

Saw Filers—

Disston's D 3 Clamp and Guide, ₩ doz., $24.00, 30%; Clamps..... 30%
Perfection Saw Clamps, ₩ doz....$4.50
Reading 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3..... 50%

Wood Workers—

Fulton Mach. & Vise Co.:
Reed 25%
Star 40%
Massey Vise Co.:
Lightning Grip, 15%; Perfect..... 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Holland's Combination Pipe..60@60&5%
Massey's Quick Action Pipe..... 40%
Parker's Combination Pipe:
87 Series, 60%; 187 Series, 60&5%; No. 870, 40%.

Wads—*Price per M.*

B. E., 11 up..... 60¢
B. E., 9 and 10..... 70¢
B. E., 8..... 80¢
B. E., 7..... 80¢
P. E., 11 up..... $1.00
P. E., 9 and 10..... 1.25
P. E., 8..... 1.50
P. E., 7..... 1.50
Ely's B. E., 11 and larger..$1.70@1.75
Ely's P. E., 12 to 20....$3.00@3.25

Dis. 15%

Ware, Hollow—

Cast Iron, Hollow—

Stove Hollow Ware:
Enameled ..... 45&10%
Ground ..... 50&5%
Plain or Unground..... 60%
Country Hollow Ware, per 100 lbs. $3.00
White Enameled Ware:
Maslin Kettles..... 65&10%
Covered Wares:
Tinned and Turned.....35&10%
Enameled ..... 45&10%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware..... 60%
Iron Clad Ware..... 70&10%
Lava, Enameled..... 40&10%
Never Break Enameled..... 50%

Tea Kettles—

Galvanized Tea Kettles:

Inch.....	6	7	8	9
Each	45¢	50¢	55¢	65¢

Steel Hollow Ware—

Avery Spiders and Griddles..65@65&5%
Avery Kettles..... 60%
Porcelained ..... 50&5@50&10%
Never Break Spiders and Griddles.. 65&5%
Never Break Kettles..... 60%
Solid Steel Spiders and Griddles.65&5%
Solid Steel Kettles..... 60%

Warmers, Foot—

Pike Mfg. Co., Soapstone....40@40&10%

Washboards—

Solid Zinc: ₩ doz.
Crescent, family size, bent frame.$3.70
Red Star, family size, stationary protector $3.70
Double Zinc Surface:
Saginaw Globe, family size, stationary protector..... $3.25
Cable Cross, family size, stationary protector..... $3.40
Single Zinc Surface:
Naiad, family size, open back, perforated $2.90
Single Saginaw Globe..... $2.75
Brass Surface:
Brass King, Single Surface, open back $3.65
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.65
Glass Surface:
Glass King, Single Surface, open back $3.65
Enamel Surface:
Enamel King, Single Surface, ventilated back..... $3.65

Washers—Leather, Axle—

Solid ..... 80&10@80&10&10%
Patent ..... 90@90&5%
Coil: ⅞ 1 1¼ 1½ Inch.
10½¢ 11½¢ 12½¢ .16¢ per box

Iron or Steel—

Size bolt.... 5-16 ⅜ ½ ⅝ ¾
Washers....$5.90 5.00 3.70 3.50 3.30
The above prices are based on $5.50 off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

Cast Washers—

Over ½ inch, barrel lots..... per lb. 1¾@2¢

Weather Strip—

Flexible Felt—

Lined, per 100 ft., $2; $3; $4..... 40&10%
Moore's Unlined, per 100 ft., $2; $3; $4 ..... 50&10%

Wedges—

Oil Finish.....lb., .@3¢

Weights—Hitching—

Covert Mfg. Co..... 30&2%

Sash—

Per ton, f.o.b. factory:
Eastern District..... $30.00
Southern Territory..$24.00@25.00
Western and Central Districts ..... $25.00@28.50

Wheels, Well—

8-in., $1.55; 10-in., $2.00; 12-in., $2.50; 14-in., $4.00.

Wire and Wire Goods—

Bright and Annealed:
6 to 9..... 80%
10 to 18..... 80&2½%
19 to 26..... 80&7½%
27 to 36..... 80&2½%
Galvanized:
6 to 9..... 75&5%
10 to 14..... 75&7½%
15 to 16..... 72½&10&2½%
19 to 26..... 75%
27 to 36..... 72½%
Coppered:
6 to 9..... 75&5%
10 to 14..... 75&7½%
15 to 18..... 72½&10&2½%
19 to 26..... 75&10&5%
27 to 36..... 75%
Tinned:
6 to 14..... 75&10&2½%
15 to 18..... 75&7½%
Brass..... 24¢ lb., base
Copper ..... 32¢ lb., base
Cast Steel Wire..... 50%

Spooled Wire—

Annealed and Tinned, 70&10@75&10%
Brass and Copper..60&10@65&10%
Retailers' Assortments, per box, $2.25@$2.50

Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

Steel Wire Goods..... 90&10%
Brass Wire Goods..... 85&25%
Brass Cup and Shoulder Hooks, 80&15%

Wire Cloth and Netting—

Galvanized Wire Netting..80&5%
Painted Screen Cloth, 100 ft., $1.35
Standard Galv. Hardware Grade: Per 100 sq. ft.
Nos. 2, 2½ & 3 Mesh..... $3.40
Nos. 4 and 5 Mesh..... $3.65
No. 6 Mesh..... $3.90
No. 8 Mesh..... $4.40

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural ..... 75@75&10%
Alligator or Crocodile..70&10@75%
Baxter Pattern S Wrenches... 70&5@70&10%
Drop Forged S..... 45@45&5%
Acme ..... 60&10%
Alligator Pattern, 70%; Bull Dog..70%
Bemis & Call's:
Adjustable S, 40%; Adjustable S Pipe, 40%; Briggs Pattern, 40%; Combination Bright, 40%.
Steel Handle Nut..... 50%
Combination Black..... 40&5%
Merrick Pattern..... 50%
Boardman's 40%
Coes' Genuine Knife Hdl..40&10&5&5%
Coes' Genuine Steel Hdl..40&10&5&5%
Coes' Genuine Key Model..40&10&5&5%
Coes', Genuine Hammer Handle..... 40&10&5&5%
Coes' "Mechanics'"...40&10&10&5&5%
Donohue's Engineer..... 40&10%
Eagle 70%
Elgin Wrenches, ₩ doz..... $6.25
Elgin Rethreading Attachment, only with one die, ₩ doz..... $6.25
Elgin Extra Dies, ₩ doz..... $3.00
Elgin Extra Jaws, ₩ doz..... $1.75
Elgin Monkey Wrench Pipe Jaws, ₩ doz..... $2.10
Gem Pocket..... 30%
Hercules 70%
W. & B. Machinist:
Case lots..... 50&5%
Less than case lots..... 50%
W. & B. Railroad Special:
Case lots..... 50%
Less than case lots..... 40&10&5%
Solid Handles, P., S. & W..... 50&5%
Stillson 65%
Vulcan Chain..... 50%
Vaughan & Bushnell Mfg. Co., Handy, 70%; Always Ready..... 50%

Fruit Jar—

Triumph Fruit Jar Wrench, 5 gross lots, ₩ gross, $7.50; ₩ doz..... $0.80

Wrought Goods—

Stables, Hooks, &c., list March 17, '92..... 87½&10@—

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers' & Freighters'..... list net

Zinc—

Sheet.....per 100 lb., $8.85@$9.10